S. HRG. 99-58, PT. 4

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1986

HEARINGS

BEFORE THE

COMMITTEE ON ARMED SERVICES
UNITED STATES SENATE

NINETY-NINTH CONGRESS

FIRST SESSION

ON

S. 674

TO AUTHORIZE APPROPRIATIONS FOR FISCAL YEAR 1986 FOR THE ARMED FORCES FOR PROCUREMENT, FOR RESEARCH, DEVELOPMENT, TEST, AND EVALUATION, FOR OPERATION AND MAINTENANCE, AND FOR WORKING CAPITAL FUNDS, TO PRESCRIBE PERSONNEL STRENGTHS FOR SUCH FISCAL YEAR FOR THE ARMED FORCES, AND FOR OTHER PURPOSES

PART 4
TACTICAL PROGRAMS

MARCH 5, 7, 12, 14, 1985

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DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1986

TUESDAY, MARCH 5, 1985

U.S. SENATE,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

ARMY TACTICAL PROGRAMS

The committee met, in executive session, pursuant to notice, at 9:30 a.m., in room SR-222, Russell Senate Office Building, Senator Barry Goldwater, chairman, presiding.

Present: Senators Goldwater, Thurmond, Warner, Cohen, Wilson, Nunn, Levin, Kennedy, Bingaman, and Glenn.

Staff present: Carl Smith, professional staff member; Arnold L. Punaro, staff director for the minority; Richard D. Finn, Jr., George K. Johnson, Jr., Doug R. Graham, David S. Lyles, John J. Hamre, and Gordon G. Riggle, professional staff members; Inga B. Schoonover, staff assistant.

Also present: Gerald J. Smith, assistant to Senator Goldwater; Les Brownlee, assistant to Senator Warner; Phil Upschulte, assistant to Senator Glenn; Bernard R. Toon, assistant to Senator Quayle; Peter D. Lennon, assistant to Senator Levin; James Steinberg, assistant to Senator Kennedy; Edward McGaffigan, Jr., assistant to Senator Bingaman; Charles C. Smith, assistant to Senator Dixon; Alan Cameron, assistant to Senator Denton; and John Rasmussen, assistant to Senator Gramm.

OPENING STATEMENT BY SENATOR BARRY GOLDWATER, CHAIRMAN

Senator GOLDWATER. The meeting will come to order.

This morning the committee meets to receive testimony on Army programs in the fiscal year 1986 Defense Authorization Budget.

Here to present the tactical portion of the Army's budget are, first, Dr. J.R. Sculley, Assistant Secretary of the Army for Research, Development and Acquisition; and Lt. Gen. Louis C. Wagner, Jr., Deputy Chief of Staff for Research, Development and Acquisition.

Unlike our program hearings in prior years—which have tended to be somewhat repetitious reviews of now very familiar programs—I have asked our witnesses this year to address a variety of additional topics. I have asked that each of the witnesses address such issues as force size, force composition, readiness levels, sustainability levels (particularly with regard to "smart" munitions), modernization rates and other related issues.

In addition, I have asked them to address briefly major noncontroversial programs and, in greater detail, those programs which are still embroiled in controversy. The Sergeant York division air defense gun (Divad) is probably the best example of that latter group.

Gentlemen, it is a pleasure to welcome you this morning and we look forward to your testimony.

Both of you, I imagine, have prepared texts which you may submit for the record if you care to and proceed as you see fit.

Dr. Sculley, I guess you are the head man.

STATEMENT OF HON. JAY R. SCULLEY, ASSISTANT SECRETARY OF THE ARMY FOR RESEARCH, DEVELOPMENT AND ACQUISITION, U.S. ARMY

Dr. Sculley. Thank you, Mr. Chairman.

With your permission, we would like to submit our prepared statement.

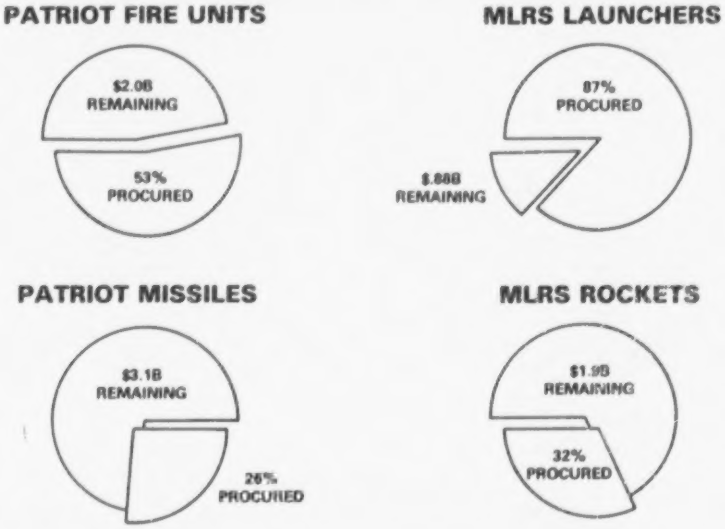
Chairman Goldwater. It will be included in the record.

Dr. Sculley. Thank you, sir.

Mr. Chairman, Senator Cohen, it is a pleasure to appear before the committee. I will be brief in my introductory remarks.

In the past we have referred to budget requests as important first steps. I would like to spend just a moment with a few slides showing you where we are in our equipping and modernization program.

MODERNIZATION PROGRESS
SYSTEMS PROCURED THRU FY85



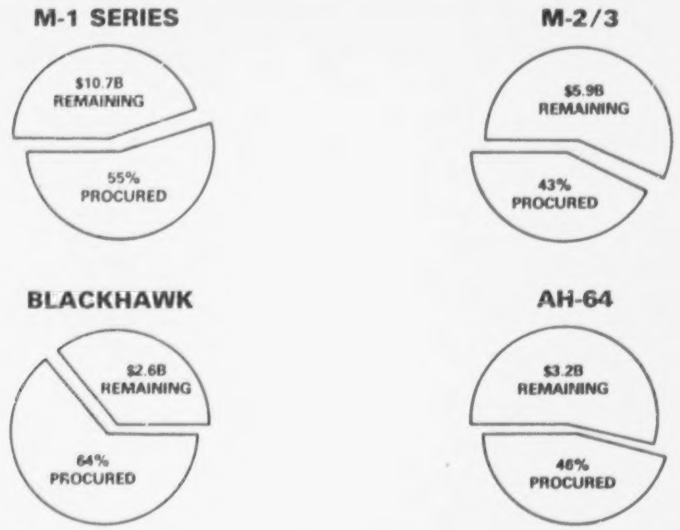
PATRIOT FIRE UNITS

MLRS LAUNCHERS

PATRIOT MISSILES

MLRS ROCKETS

MODERNIZATION PROGRESS SYSTEMS PROCURED THRU FY85



KEY SYSTEMS

Dr. SCULLEY. Roughly, sir, in some of our key systems we are at the midpoint. We are at the midpoint because of the past support of this committee and others in Congress.

To continue and support these past efforts, we are presenting a combined procurement and RDT&E request for $26.6 billion for fiscal year 1986.

STATUS OF EQUIPMENT PROCUREMENT PROJECTED FOR 28 FEBRUARY 1985

SYSTEM	ON HAND	TOTAL PROGRAM
ABRAMS	2,507	7,467
BRADLEY	1,591	6,882
APACHE	20	675
SGT YORK	36	614
PATRIOT	15	103
HMMWV	8	88,946
CUCV	23,565	68,210
5-TON	10,606	63,986
10-TON	3,206	17,119
STINGER	6,895	54,730

I would show just the sheer quantity at the end of February that we now have in the hands of soldiers in the field, significant quantities, 2,500 M1's, as an example, 23,000 commercial utility cargo vehicles, and 10,000 5-ton trucks.

I think this is quite representative of where we are in our program.

Chairman GOLDWATER. Is that HMMWV the HUMMER?

Dr. SCULLEY. Yes.

General Wagner will talk in more detail on our program, as you know, during his presentation.

In short, our modernization effort today and in the future must be viewed as a coordinated effort in several different areas. We should not look at the effort on a system-by-system basis and assume no interrelationship.

I also would like to make a point with the committee, Mr. Chairman, that our modernization effort also applies to the reserve components, a very key element in our total Army.

National Guard and Army Reserve units are receiving and will continue to receive new and improved equipment. In the fiscal year 1986 request alone three more National Guard battalions will receive both Abrams tanks and Bradley fighting vehicles.

I would also, to be brief, and in summary of my opening statement, touch on our effort to improve the management of our acquisition process.

ACQUISITION MANAGEMENT

The Army is firmly committed to improving acquisition management. We believe our current efforts are paying off with lower costs, more coherent and stable acquisition programs.

MULTIYEAR PROGRAMS
(FY 82-85 STARTS)

	PROGRAM	SAVINGS $ (M)	FY'S
FY 82:	M1 FIRE CONTROL	131.1	82-85
	BLACKHAWK AIRFRAME	81.1	82-84
	ALQ-136 RADAR JAMMER	34.6	82-84
FY 83:	T700 ENGINE	75.1	83-85
	MLRS	209.1	83-87
	M60 THERMAL SIGHT	56.0	83-85
	BFVS (COMPONENTS)	118.7	83-85
	PLRS	57.4	83-86
	HMMWV	88.0	83-87
FY 84:	NO NEW STARTS		
FY 85:	BLACKHAWK AIRFRAME	129.5	85-87
	CH-47D	153.4	85-89
	SHOP EQUIPMENT	74.3	85-89
	5-T TRUCK	60.0	85-87
	BFVS (TURRET DRIVE)	16.6	85-87
	TOTAL SAVINGS (FY 82-89)	1,284.9 (M)	

Multiyear contracting is a means to reduce cost. It is a means to prevent program stretchout and ensure early fielding of new systems.

With the help of Congress, we have been able to achieve savings from earlier multiyear procurement in excess of $1.2 billion.

MULTIYEAR PROGRAMS
FY 86 STARTS

PROGRAM	SAVINGS $ (M)	FY'S
M1 FIRE CONTROL	96.1	86-89
M1 ENGINE	159.8	86-89
M1 CHASSIS	393.7	86-89
T700 ENGINE	71.1	86-88
M9 ACE	31.2	86-90
M1 COMPUTER/CONTROL PANEL	7.3	86-89
BRADLEY TRANSMISSION	25.5	86-88
TOTAL SAVINGS: (FY 86-90)	784.7	

The request in fiscal year 1986 with multiyear savings on M1 fire control, M1 engine, M1 chassis, T700 engines, and M9 ACE totals nearly $800 million in savings through multiyear contracting.

A final item I will leave with you is that we have also made an effort to improve our contracting to achieve better program control.

CONTRACT TYPE

	FY 81	FY 84/85
BRADLEY	FPI	FFP
M 109	CPIF	FFP
AH-64	FPI	FFP
CH-47	FPI	FFP
HELLFIRE	CPIF	FFP
MLRS	FPI	FFP
PATRIOT	CPIF	FPI
PERSHING	CPIF	FFP
STINGER	FPI	FFP
COPPERHEAD	CPIF	FFP
SINCGARS	CPIF	FFP
PLRS	CPFF	FPI

The next chart shows that in 1981 many of our major programs were under a cost-plus incentive type contract.

Today most of these programs are under fixed-price arrangement.

Additionally, we have taken continued steps to increase competition. New programs such as SINCGARS, LHX, and the Advanced Antitank Weapon System, are all being developed to ensure competition not only up front but throughout the acquisition cycle.

In addition, we have recently appointed a general officer, Gen. Charles Henry, as our competition advocate.

Since 1980 we have increased our competitive percentage of dollars awarded from 37 percent to in excess of 42 percent in 1984.

The efforts are bearing fruit. The concrete results are demonstrated. The Black Hawk Program since 1981 requires 14 percent fewer hours to build it. AT700 engine, 28 percent fewer hours to build it, and M1 tank reduced by 23 percent.

To sum up, these are challenging times for research, development, and acquisition. Our Army requires a materiel acquisition program that will sufficiently equip the force in a timely manner, modernize it and protect its future.

The picture, I can tell you today, is brighter than it has been in some time. Our challenge, and I think I speak collectively, is to keep it bright. To do this, we need your continued support of our program to prevent a slip backwards.

At this time I would like to introduce Lt. Louis Wagner, the Deputy Chief of Staff for Research, Development and Acquisition, who, along with Mr. Dick Lewis, our Director of Army Research and Technology, will present more detail on our Army programs.

Thank you, Mr. Chairman.

[The prepared statement of Dr. Sculley follows:]

PREPARED STATEMENT BY HON. JAY R. SCULLEY, ASSISTANT SECRETARY OF THE ARMY (RESEARCH, DEVELOPMENT AND ACQUISITION)

Mr. Chairman, members of the committee. It is a privilege for LTG Wagner and me to appear before this committee to explain how our Army proposes to continue its modernization program. We look forward to working with you to meet our common goal—that of providing an army of excellence.

In the past, we referred to budget increases as important first steps toward resolving significant deficiencies in both quantity and quality or our arms and equipment. I can report to you today that your support has begun to show a payoff in our Army.

The dollars appropriated through fiscal year 1985 provide us roughly half of the quantities of major systems we plan to procure. These graphs show the progress for some of our major hardware items.

This past support is also beginning to show payoffs in the amount of hardware that has been produced and is available for our soldiers use. Today we have over 2,500 M1 tanks, 1,500 Bradley's, 20 Apache's, 15 Patriot fire units, 600 Blackhawks, 23,000 CUCV's, 10,000 5 ton trucks and 6,800 Stinger missiles.

To continue and support these past efforts we are presenting a combined procurement and RDTE request of $26.6 billion for fiscal year 1986. These funds will continue the improvement of the Army's near-term readiness posture, continue to modernize the total force, and support research and development of future weapon systems.

The only way for us to overcome the threat we face is to use our technology to modernize our forces. The air land battle doctrine provides the doctrine for how we operate today and for the systems which must be developed for the Army in the twenty-first century. The air land battle is one battle consisting of three parts: Deep attack, close-in, and rear battle. The synchronization of weapon systems for the three parts of the battle are essential to provide the commander the combat power to win the key battle along the forward line of troops. Continued research and development is essential to provide follow-on systems that will provide this synchronization of the battlefield.

The deep battle portion of the air land battle seeks to delay, disrupt, or destroy the enemy's succeeding echelons and isolate committed forces. Systems such as the remotely piloted vehicle (RPV), joint surveillance and target attack radar system (JSTARS), multiple launch rocket system (MLRS) and joint tactical missile system (JTACMS) are key to allow the combat commander to detect, identify, and attack deep targets.

The commander must allocate combat power to protect the rear battle area. Air defense of the rear battle area is essential to the execution of air land battle. Patriot, Roland, improved Hawk and Chaparral will provide this protection.

The primary objective of both the deep attack and rear battle forces is to provide the commader the ability to destroy the enemy close-in along the forward line of troops. The Abrams tank and the Bradley fighting vehicle systems have the capability to be able to rapidly close with the enemy. The Apache attack helicopter is key because it provides the rapid reaction vital to close-in support. At the same time, the Sgt York and Stinger provide the air defense protection needed to execute decisive action along the forward line of troops. The key elements which tie the total effort together and allow the combat commander to control his maneuver elements are his communications, command and control. Systems such as the single-channel ground and airborne radio system (SINCGARS), army data distribution system (ADDS), mobile subscriber equipment (MSE) and joint tactical fusion system are a must to ensure success.

In short, our modernization effort today and in the future must be viewed as a coordinated effort in several different areas. We should not look at the effort on a system by system basis and assume no interrelationships.

It is important to note that our modernization effort also applies to the reserve components, a key element of our total Army. National Guard and Army Reserve units are receiving and will continue to receive new and improved systems as part of the total force. Their requirements are built into the Army's acquisition plans to cover the full spectrum of their mission needs. For example, a battalion of the North Carolina National Guard has received Abrams and Bradleys. Three more National Guard Abrams and Bradley battalions will be fielded this year. Other systems such as Roland and Stinger air defense systems, utility helicopters, upgraded Cobra helicopters, and other essential systems are being issued to reserve component units. The fiscal year 1986 budget includes provisions for a number of accelerated reserve component equipment packages. The request includes accelerated upgrade of tanks to the M60A3 model and conversion of AH-1G Cobra attack helicopters to the S model.

A final area I would like to touch on is our effort to improve our management of the acquisition process. The Army is firmly committed to improving acquisition management. We believe our current efforts are paying off with lower costs and more coherent and stable acquisition programs.

Multiyear contracting is a means to reduce costs, prevent program stretchouts, and ensure early fielding of new systems. With the help of the Congress, we have been able to achieve savings from multiyear procurements in excess of $1.2 billion since fiscal year 1982. To continue this effort, we are proposing multiyear procurements for the M1 fire control, M1 engine, M1 chassis, T700 engines and M9 Ace in our fiscal year 1986 budget. The projected savings from these contracts are over $800 million.

We have also made an effort to improve our contracting to achieve better program control. This chart shows that in fiscal year 1981 many of our major programs were under cost or incentive contracts. Today we have most of these programs under fixed price arrangements.

Additionally, we have taken continued steps to increase competition. New programs such as SINCGARS, LHX and advanced antitank weapon system-medium (AAWS-M) are all being developed to ensure competition throughout their acquisition cycle. We have recently appointed an Army competition advocate. Since 1980 we have increased our competitive percentage of dollars awarded from 37.1% to 42.3% in 1984.

These various efforts to improve our acquisition management have produced concrete results in the price we pay for our hardware. Since 1981 we have been able to reduce the hours required to build a Blackhawk by 14 percent, a T700 engine by 28 percent and a M1 tank by 23 percent.

To sum up, these are challenging times for research development and acquisition. Our Army requires a materiel acquisition program that will sufficiently equip the force in a timely manner, modernize it, and protect its future. The picture is brighter now than it has been in a long time, and our challenge is to keep it bright. To do this, we need your support to prevent any slip backwards.

COMPETITIVE CONTRACTS

Chairman GOLDWATER. Thank you very much, Dr. Sculley.

You mentioned that you have increased the number of competitive contracts now from what, 31 percent to 40 percent?

Dr. SCULLEY. In 1981 the competitive percentage of dollars was 37.1 percent. With a larger budget we have increased that percentage of competitively awarded contracts to 42.3 percent through fiscal year 1984.

So, competition is a key word with us.

Chairman GOLDWATER. Is that enough in your opinion?

Dr. SCULLEY. It is seldom enough. We have set higher goals and we will continue to strive for those goals. The competition advocate literally will question any procurement that is not competitive in nature. That is his job on the Army staff and in addition, General Thompson at the Army Materiel Command has designated a general officer in each of his commodity commands to serve as a competition advocate and literally question every procurement that is not competitive in nature.

Chairman GOLDWATER. Will you keep the committee posted on those changes as fast as you get them?

Dr. SCULLEY. Yes, sir.

Chairman GOLDWATER. Thank you.

General?

STATEMENT OF LT. GEN. LOUIS C. WAGNER, U.S. ARMY, DEPUTY CHIEF OF STAFF FOR RESEARCH, DEVELOPMENT, AND ACQUISITION, ACCOMPANIED BY DICK LEWIS, DIRECTOR, ARMY RESEARCH AND TECHNOLOGY

General WAGNER. Thank you, sir.

It is a pleasure for me to be here today. This is the first time I have appeared in my new position as Chief of Research, Development, and Acquisition, although I have been here before representing the user as the Chief of Requirements.

RDA OVERVIEW

I am going to discuss the overall way we put our program together in research, development, and acquisition because I think we have made some real headway in this. It is something you should be aware of.

I will then touch very lightly on some of those programs that are on track. Only when there is an important item that should be pointed out do I plan on zeroing in on programs that we have problems with, either real problems or problems that may have been reported in the press that we don't necessarily agree with.

I would say up front that we have not found a cure for the flu or common cold, so I hope I don't start coughing. I have been fighting it for a week, but I will do my best.

Everything we do in the Army is based on the mission that the United States gives to the Defense Department. The Army is that particular member of our Armed Forces that has to occupy the ground if we are to have a deterrent capability and the capability of fighting if that deterrence fails.

UNITED STATES DEFENSE STRATEGY

Deter aggression and coercion against the U.S. and its allies.

Should deterrence fail, seek earliest termination of conflict on terms favorable to us, our allies and national security objectives while seeking to limit the scope and intensity of the conflict.

Our entire program, both in the force structure and in putting together our research, development, and acquisition, is tied to that mission. It is an Army policy that we do not develop a piece of equipment, then figure out how to put it in the force structure.

We design the force structure we need to carry out the national policy and then design the type of division with the personnel and the equipment to do that job.

There are just a few points I want to point out. You had an extensive review of this yesterday. I am going to touch very quickly on a few key weapon systems that we will face on the adversary's side in a NATO war.

Production of Ground Forces Materiel USSR/NSWP and NATO[1]

Equipment Type	1979 USSR	1979 NSWP	1980 USSR	1980 NSWP	1981 USSR	1981 NSWP	1982 USSR	1982 NSWP	1983 USSR	1983 NSWP	1983 NATO
Tanks	3,500	800	3,100	700	2,000	520	2,500	800	2,700	560	1,650
Other Armored Fighting Vehicles	6,000	1,800	6,500	1,300	6,200	1,300	4,500	1,400	4,500	1,300	2,280
Towed Field Artillery	1,400	150	1,400	150	1,600	200	1,800	250	1,700	300	335
Self Propelled Field Artillery	900	10	900	50	1,000	50	1,100	50	1,100	100	155
Multiple Rocket Launchers	600	150	700	150	700	150	700	100	700	100	95
Self Propelled AA Artillery	300	100	300	100	300	50	200	50	100	0	0
Towed AA Artillery	–	200	–	150	–	250	–	200	–	225	125

[1] Revised to reflect current total production information. Includes United States, excludes France and Spain

If you look at the production rate of tanks, in 1983 the Soviets and the non-Soviet Warsaw Pact produced about twice as many as the entire NATO forces did. That is no surprise. In fact, in 1984 and 1985 it appears they are increasing their production rate.

If you take a look at the other vehicles, they outproduce us again over 2 to 1. They are the only country that produce large numbers of true fighting vehicles. I am going to touch on that a little later.

SOVIET PRODUCTION

We are just beginning to produce our first fighting vehicle. When you get down into the field artillery, they are outproducing us at the rate of 1,200 to 155. Those are just a few examples of the problems that we are up against and for those people who believe that we have the quality to overcome that quantity, I assure you that all of those items of equipment that they produce today are close to or on a par with the modern equipment we are producing.

Senator KENNEDY. General, before you leave that, if you had an open-ended budget, would you try to equal what they are producing or are we at the right level?

General WAGNER. I would never try to equal them, sir, because I couldn't man it.

Senator KENNEDY. What is the optimum in terms of where we ought to be given where they are? I think for the real advance of the chart it is significant to know where we are and what is necessary for us to defend the interests of our allies and ourselves. I would like to measure that versus what they have.

General WAGNER. For example, for us to modernize our forces with M1 tank today, to include our active components and reserve components that would deploy with those active components on the first day of the war or 10 days thereafter, we would have to procure 7,000 tanks. It will take us until 1992 to do that and we started procuring them in 1982.

The Pact will be able to modernize within about 2 years with that same number of tanks. So, as a result, for us to come up to approximate par on the type of tanks we have, it is going to take us 10 years.

If we had the dollars, we would like to do that in 3 or 4 years so that we could keep up with them, but we don't have those dollars and never will.

Senator **Kennedy**. That was not my question. My question is in relationship to those figures you have there, if you just take your choice, where would we come out in terms of production of the comparable weapons systems? That is my question.

You have our numbers down there, what they have produced. You have indicated you would not want to match them.

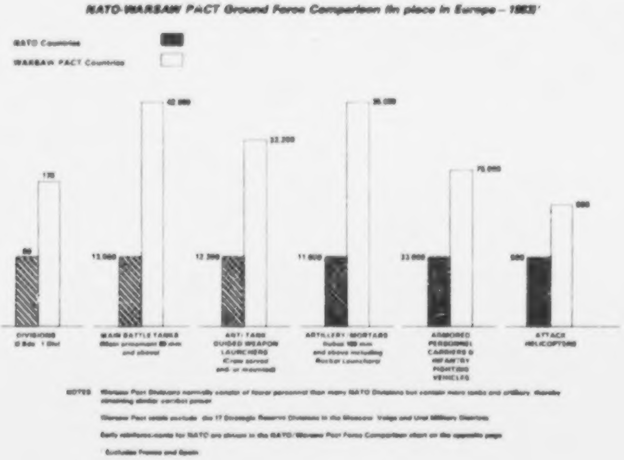
My question is: Where would you come out in terms of achieving what you have outlined in your opening statement in saying you want equipment to deal with the nature of the threat?

So, my question is: What would be the optimum?

General **Wagner**. Given a choice, I would modernize our tank fleet in a period of 3 years like they do. That would require tripling the production rate that we have today. I couldn't do that because we did not facilitize to do that in the United States.

We know we are going to do it over a long period of time. If I want to keep my forces on a par qualitatively and try to counter their quantitative advantage, I would have to do that in 3 years instead of 10, but we don't have those dollars.

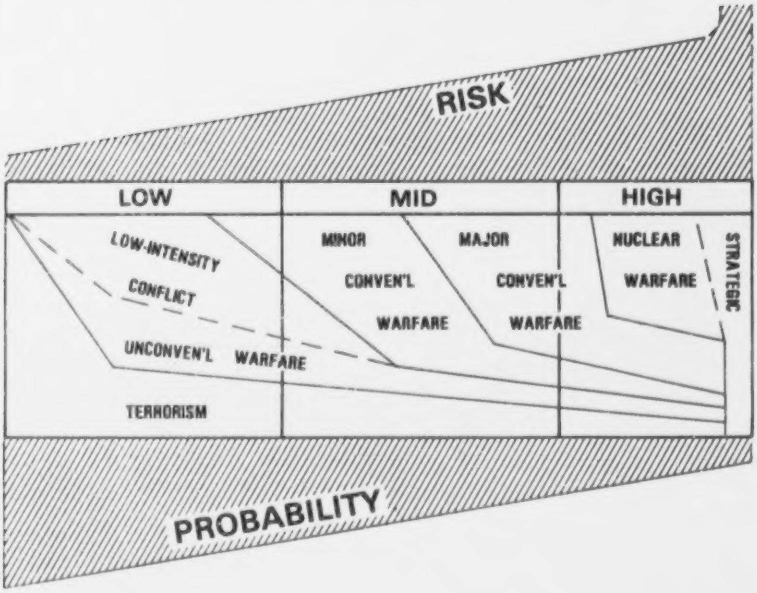
We are looking for the best balanced program we can get to fight the battle.



This gives you some indication of the numbers of systems in the ground forces and NATO versus the Warsaw Pact. I would point out that this excludes France.

Although they pull them out in all the reports, you probably saw that yesterday in the DIA report, I feel that the day the war starts France will be fighting with us. If we added them, we would have 20 additional divisions which would bring us up to 106. We would still be outnumbered in number of tanks, but I believe they would be fighting with us.

A SPECTRUM OF CONFLICT


RISK
LOW
MID
HIGH
LOW-INTENSITY CONFLICT
UNCONVEN'L WARFARE
TERRORISM
MINOR CONVEN'L WARFARE
MAJOR CONVEN'L WARFARE
NUCLEAR WARFARE
STRATEGIC
PROBABILITY

FORCE STRUCTURE/EQUIPMENT DEVELOPMENT

The first problem that the Army faces in meeting our worldwide commitments is in designing the force structure and then developing the equipment and buying that equipment to be able to face all of our contingencies from terrorism at the low side where there is a high probability of its occurring to a strategic nuclear war on the high side where the probability is relatively low. But that risk is so high that we can't disregard it because that is the only war that we can't afford to lose.

That would be the war in central Europe. If we lose that war, we lose Western Europe and probably lose the United States.

So, the problem we face is getting the proper structure, first of all, between our light forces which are mobile and can respond to a smaller threat, and the heavy forces which would fight the principal part of the war in central Europe.

I point out, however, these are complementary forces. You can't fight any of those wars for any extended period of time without a combination of forces. You need heavy and light and you need the same thing in central Europe.

ARMY DIVISIONS AVAILABLE FOR DEPLOYMENT

	TODAY	FY 86
ARMOR	6 (2)	6 (2)
MECHANIZED	7 (1)	7 (1)
INF DIV (MTZ)	1 (0)	1 (0)
INFANTRY	7 (5)	6 (5)
LIGHT INFANTRY	1 (0)	2 (0)
AIRBORNE	1 (0)	1 (0)
AIR ASSAULT	1 (0)	1 (0)
TOTAL	24 (8)	24 (8)

These are the forces we have in our structure today. When I say today, I really mean at the end of this fiscal year. We have 24 deployable divisions. Eight of those are in the reserve components.

You will see we have the armored divisions and mechanized divisions. No changes are planned in those particular divisions except modernizing them and making internal changes in force structure.

One infantry division motorized. We have one that is deployable today, but not as a complete motorized division. It will be late in 1986 or 1987 before we can deploy as a complete motorized division.

On the infantry side we have standard divisions as shown here and we are changing some of these to our new 10,000-man light division.

The 7th Division is converting this year at Fort Ord, CA, and will be deployable. The 25th Division is converting next year. The 10th Mountain Division that we are activating at Fort Drum, NY, and the 6th Division we are activating in Alaska will be deployable in 1988 and 1987.

Finally, if we have to make an incursion and force our way by forced entry into a conflict, we have our airborne division, the 82d. No change in that. However, we are modernizing it with some equipment and streamlining the structure.

Finally, if we need a lot of mobility on the battlefield and antitank capability, we have the 101st Air Assault at Fort Campbell, KY. It is around that force structure that we design the procurement and research and development programs to make sure that they are properly balanced.

Senator THURMOND. As I understand, General, the light infantry you are increasing from one to two in 1986.

General WAGNER. Yes, sir. We are converting in 1986.

Senator THURMOND. You are converting to light?

General WAGNER. Yes, sir. The 25th Division in Hawaii will be converting to the 10,000-man light division in 1986.

Senator THURMOND. That is the only change that appears here.

General WAGNER. As far as those divisions that are deployable at that time. We are, over time, activating the 10th Mountain Division in Fort Drum, NY, but that will be dependent on when the facilities are available to put the troops on the ground, because we are not going to activate units until we have the facilities to put them in.

The flag is planted today, but it will be in the 1987-1988 timeframe when they are a fully deployable 10,000-man division.

Senator WILSON. You say the 6th Armor, 7th Mechanized, is the Bradley fighting vehicle?

General WAGNER. There is only one difference and that is whether it has five or six tank battalions and four or five mechanized battalions and vice versa. They are approximately the same. Armor divisions have one more tank battalion and mechanized divisions have one more mechanized battalion.

They both have Bradley fighting vehicles. They have the Bradley Cavalry fighting vehicle in the cavalry units of their tank battalions and is the division cavalry squadron. They are essentially the same. We call them heavy divisions because they are so close in capability that they are almost a wash on the battlefield. One has a little more infantry, one has a little more armor. For example, you look at the terrain in central Europe and determine where you would put the one with the most armor for a breakthrough or one with the most infantry possibly to get into cities.

Senator THURMOND. What is the HTMD?

General WAGNER. That is the motorized 9th. It used to be called the high technology light division. I will show you later the particular equipment that goes into that division. It is designed for fighting in open spaces against armor forces where the threat is not as severe as in Central Europe, for example, in Southwest Asia, so that it can move rapidly about the battlefield, have fire power approaching the heavy division, but be much more deployable. It can be deployed in 13 to 1,400 sorties where you can only transport a heavy division by ship if you want to get it there in any reasonable period of time.

AIRBORNE AND AIR ASSAULT DIFFERENCE

Senator THURMOND. What is the difference between airborne and air assault?

General WAGNER. Airborne is a paratrooper infantry unit. It is really foot mobile when it gets on the ground with the exception of some of the scouts.

The air assault is mounted primarily in helicopters. It has a lot of antitank fire power. All of the infantry in that division can be transported, but not all simultaneously. You can lift about a brigade of them at one time to move rapidly about the battlefield.

It has tremendous mobility when it gets on the ground and a lot of antitank capability.

Senator THURMOND. Thank you.

TYPES OF EQUIPMENT NEEDED FOR INFANTRY

Senator KENNEDY. I think we requested last year from the Army the types of equipment for the infantry divisions, the kinds of equipment they were going to need over a period of time. I think it was requested by this committee.

General WAGNER. Yes.

Senator KENNEDY. Do you expect to provide that information?

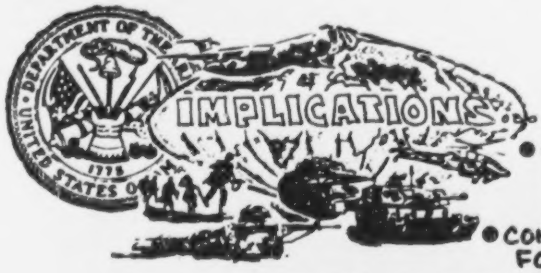
General WAGNER. I am going to cover some of that equipment. There is a formal report that is being prepared on that now. It is in the final stages of preparation.

I have seen a lot of units activated over time. For the very first time this is one where every single item of equipment going into that division is being closely monitored to make sure when it is available so that we do not activate a unit until all of the equipment, the ammunition, and so forth, is there to go with it.

In fact, there is a General Officers Steering Committee that meets monthly and goes into every single item of equipment in details for those divisions.

Senator KENNEDY. We will assume that is consistent with what your plans are?

General WAGNER. Yes, sir, it is.



AN ARMY WITH

- GREATER STRATEGIC UTILITY FOR TOTAL FORCE
- CONTINUED HEAVY FORCE MODERNIZATION
- IMPROVED TOTAL FORCE BALANCE (HEAVY-LIGHT) ACROSS SPECTRUM
- ADDITIONAL AC LIGHT DIVISION
- ENHANCED NON DIVISIONAL LIGHT FORCES (SOF- RANGER)
- CONSTANT END STRENGTH
- AN AFFORDABLE PROGRAM
- INCREASED PLANNING FLEXIBILITY
- ADDED DETERRENT VALUE

We believe with a change in our light infantry there is improved strategic utility for the total force. If we can get there quickly in some of those inflammatory areas like we did in the Caribbean a year ago, we put it down before it expands into a major problem. We feel we need that light capability.

We are increasing our special operations and ranger units because they also give us a great capability on the lower side of the spectrum, but our special operations forces also have a major role to play in a war in central Europe with the operations they would perform behind the lines. They have many missions there. They speak the language and they are prepared to move in, in case of war.

A key to everything we do in the Army today, and I don't have to say that again because General Wickham has pointed it out over and over, is our frozen end strength of about 781,000. So, we are doing the very best we can to get the greatest fighting capability out of that 781,000, but yet have the capability of supporting them.

A lot of things we are doing in research, development, and acquisition is going to help us. For example, we are putting in a lot of unglamorous equipment like new forklifts, things of that nature, so that we can fully man the combat service support ammunition units we need.

I am going to point out some of those things a little bit later.

AIRLAND BATTLE

I am not going to teach you how to fight the AirLand Battle, but I think it is very important to understand the AirLand Battle and the type of equipment you need to fight that battle.

There has been a misperception in many newspaper articles, and so forth, that if you destroy the enemy deep, meaning at a distance of 100 to 200 kilometers, before he reaches the forward line of troops, or really the front line of battle, that it is going to be a cheap way of defeating him and you are not going to lose any lives.

I can assure you that there is nothing further from the truth because it would be easy for him to change his tactics if that is the only threat you have.

The key battle will also be fought right here at the forward line of troops or the front line. Everything we do in our doctrine is to make sure we win there. The reason we have to be able to attack him deep is so that we can disrupt his timetable and allow us to design that battle instead of allowing him to do so.

Finally, we have to be conscious of our rear area and be able to execute that portion of the battle. Today we have limited capability of finding him for our front.

JSTARS

So, I need something to do that. That is the JSTARS which is a stand-off radar system which will allow me to look out about [deleted] and find him. I am going to talk more about this system later because it is a joint program with the Air Force. Incidentally, we think it is going to be very successful.

We can get all of the data in the world from that and other intelligence systems, but today we don't have any way of quickly reducing that data so that the commander on the battlefield can utilize it and then decide what to attack it with and when to attack a particular target he finds out there.

JOINT TACTICAL FUSION

To solve that problem we have another joint program with the Air Force called the Joint Tactical Fusion Program which gives the

Corps commander the capability to use that data so that he can get ahead of the enemy, anticipate his actions and then attack him.

Finally, we have to have some way, both in the Air Force and the Army, of attacking him beyond the forward line of troops.

Chairman **Goldwater**. Why should you assume what you have just said you assume, that the decisions are going to be made on the front line of that area?

Why can't decisions be made back?

General **Wagner**. I did not mean it that way. I mean the decisive battle will be fought there. The man who makes the decision, and really the orchestrator of that battle, is the Corps commander.

The division commander executes it, but it is the Corps commander that has three to five divisions fighting against the Combined Arms Army that is going to make those decisions and orchestrate the battle. He is the one in addition to the division commander, that is going to use this fusion capability. He is the one to make the decision when to fire the JTACMS [Joint Tactical Missile System]. JSTARS is really supporting his intelligence-gathering means.

Chairman **Goldwater**. That still does not eliminate the possibility that the forces forward can decide the battle before you reach the battle line? It may not work in every instance. I don't think you make that basic assumption.

General **Wagner**. The plan to win is back here.

Chairman **Goldwater**. I am talking about back here.

General **Wagner**. The execution of this battle is at the division commander level, the brigade commander level or battalion commander level who will get the overall plan from the Corps commander, but they will execute it and that is where the final battle will be won. No question about it, sir.

This is the reason why we have to have the equipment to do it, the attack helicopters, tanks, Bradley fighting vehicles, et cetera.

Chairman **Goldwater**. In your doctrine, even in your field manual the emphasis should be put on a possibility of winning that engagement any place, back here or up to the battle line. That is why we have the airborne. That is why you have your tactical assault weapons.

I don't want to see you adopt the attitude that it has to be won on that front line. I don't want a commander under me saying I am going to win it there. I want to win as fast as I can.

General **Wagner**. He won't win it there, that is true, unless we can do something out here. If we can ever have a complete capability of destroying him out there and causing him to back off, that would be great.

I am just saying we can never forget that that is where they meet eye to eye that the battle is usually won. We have to at least make sure we are equipped to do it there. You win it any way you can as soon as you can.

Senator **Kennedy**. Of the equipment that would be utilized in this situation, the AirLand Battle, what percent of that do you have today and what percent are you going to need to procure in the future, just generally?

General **Wagner**. We have 50 percent of our M1 tanks, and 30 percent of Bradley's procured. That does not mean they have been delivered, but they have been procured. We are just beginning to get our Apache attack helicopters. We have zero in JSTARS, tactical fusion and a very limited deep strike capability.

Senator **Kennedy**. What is your general kind of flow line in terms of having the equipment to be able to implement the Air-Land Battle?

What could we expect over what period of time if you got the equipment that it looks like you are going to get in the authorization and appropriation?

General **Wagner**. By the early 1990's we will have generally outfitted the people on the front line. Obviously, you are going to upgrade them all the time. It will then be 1990 and beyond before we have the capability of really fighting that deep battle.

Senator **Kennedy**. How far advanced is the Soviet Union with a similar kind of concept? How would you evaluate that at the present time in comparison with the capability of the allied forces?

SOVIET DOCTRINE SYSTEMS

General **Wagner**. Sir, their doctrine is not a lot different from ours. They plan on attacking in a combined arms offensive and moving a minimum of 50 kilometers per day. To do that, they have to have highly mobile forces just as we have to counter them. They have a vast array of air defense systems to give them the cover when they move in there.

They greatly outnumber us in the tactical missiles to strike our rear. They have forces [deleted] level that are designed today to strike in our rear.

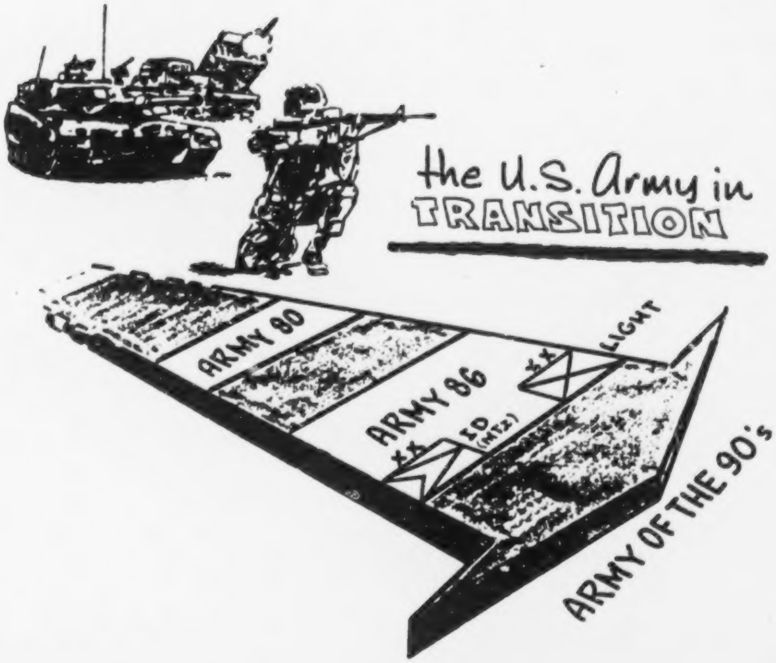
They also consider this battle to be one across the entire spectrum, rear to the front.

Senator **Kennedy**. How far are they along the line in terms of outfitting their particular units to be able to fulfill their mission as you view it today?

General **Wagner**. I believe they are ahead of us in the capability of striking deep. They are not ahead of us in the capability of finding where to strike us deep.

The advantage they do have is the fact that they know exactly where we are going to fight in Central Europe. They know where a lot of our key installations are, and so forth. So, in a preemptive strike they would have a tremendous advantage in being able to hit us with missiles.

Once that war becomes a mobile war, then they would have difficulty finding us.



All I want to point out on this chart is that to be able to fight that battle and to make sure that we make the maximum utilization of all of the equipment that you are supporting us in, we have to look at our tactics and our doctrine and our organization because, for example, it does no good to give the soldier an M1 tank that has much more capability than the tank he has today and then not change his doctrine and not take advantage of that particular piece of equipment.

For example, I am an armor officer, and former commander of the Armor Center. When I was a lieutenant, I was taught an armor officer always had to think one terrain feature ahead because we can move cross country 8 to 10 miles an hour in an M48 and the early model, M60 tanks.

Today we teach that same individual in the armor school that he has to think three terrain features ahead because the M1 and M2 and all the supporting equipment can move cross-country three times that speed today.

That does not mean we get up like cavalry and charge at that speed, but it gives the commander on the battlefield tremendous flexibility because he can move a unit from point A to B to hit the weakness of the enemy and concentrate his forces much quicker.

The same is true of our helicopter forces with the rapid capability we have today to bring those forces together and strike the enemy at his weak spot.

If we are to take advantage of those systems, we have to change our doctrine and tactics. That is the reason we have redesigned our division and that is the reason we have changed our doctrine to think ahead and make use of that good equipment.

We have the three types of divisions that I discussed earlier. I am not going to go into great detail on the types of equipment that are shown so far as programmatic aspects because I am going to cover the important ones later on.

MODERNIZATION

The basic fighting change in the heavy division is your tanks and infantry and cavalry fighting vehicles, backing them up with a lot of antitank capability including the AH-64, Apache with Hellfire missiles. Supporting them is the AHIP helicopter, a scout helicopter which just finished testing in California. It has done very well.

For the first time we have a multiple launch rocket system since World War II which gives us tremendous fire power on the battlefield as compared to try to mass fires of conventional tube artillery.

On the support side you will find in our procurement budget this year an armored combat earth mover [ACE]. I point out that the ACE is not designed to move the amount of dirt in a given hour that a bulldozer can move, but is designed to let the operator survive on the battlefield and be able to move rapidly cross-country when necessary to support the forces in the heavy division. You will also find that particular vehicle in our light division.

I will talk about the Sergeant York DIVAD gun later.

The nerve center of all of this equipment is our mobile subscriber equipment and area communications system which will allow us to communicate and move those forces throughout that battlefield.

I will also speak of that later.

MOTORIZED DIVISION

What do we have in the motorized division, which is designed to fight primarily in Southwest Asia to have much greater firepower than a light infantry division, but also be able to be moved to any part of the world relatively rapidly, is not a lot different than we find in the rest of the division.

There are just a few unique pieces of equipment. For example, we have the same five-quarter ton, high mobility, multipurpose wheeled vehicle [HMMWV] that we have in all our divisions. We are developing on an expedited basis a scatterable mine system, called Volcano. It will be in all our forces. It will be fielded first in the 9th Division, but it will ultimately be fielded in all of our divisions.

It will have the capability of dispensing scatterable mines in the field from both aircraft and vehicles. It is being designed around the Air Force Gator mine so that we are buying the same mine for all the services. It fires the same "smart" munitions as in Copperhead that we have in the rest of the division.

We have, with the deliveries that have already been approved, about 15,000 of them in our program today. We will go to over 30,000.

Finally, where we can buy off the shelf to do the same job instead of going out and designing something, we are doing it. This is the small emplacement excavator which is commercial equipment that will allow them to dig in.

A unique equipment is a fast attack vehicle [FAV] which is a small, light, highly mobile vehicle that will be a firing platform for TOW missiles and MK-19 40-millimeter machine guns. It will also be a command and control vehicle for the 9th Motorized Division.

That is a unique piece of equipment in the division.

Senator **Kennedy**. General, you have given, obviously, a number of the items we have seen up there that have been on track for some period of time. There are, obviously, new weapon systems, too.

What do you anticipate is going to be the problem that you will have with these new pieces of equipment? What should we expect when you come back here in another year? How complex are these new systems?

There seems to be a wide variety of different kinds of new equipment that is being developed and carried forward, this new concept in the AirLand battle which it seems to me makes a good deal of sense.

How many pieces of new equipment and how complex are they going to be and how much difficulty are we going to find over a period of time and how essential are those pieces of equipment to be able to carry forward the objectives which you have outlined which I certainly would agree with and which all of us would support?

Are you concerned about this as somebody who has been dealing with these problems over a period of time? Should we be concerned about it?

You can't help but see these slides and see these systems, obviously a number of them have been on track for some period of time, but how troubled should we be about this type of issue?

LOGISTICAL SUPPORT

General **Wagner**. I will answer the last part first, sir.

First of all, we are worried about it and we are watching it very carefully to make sure we have the support base to properly support them.

Second, they are absolutely essential to execute our doctrine in the AirLand battle.

In designing systems that are going out there today we pay more attention than ever before to make sure they are logistically supported.

When we say it is a complex piece of equipment, complexity can refer to the way it is designed, but it can also be very user friendly. For example, it is much easier to train a soldier today on the M1 tank than it is on the M60A3 that we had in the past. Exercises in Germany have shown that individuals who are about equal in training on that particular vehicle, can score 50 to 60 percent higher on firing ranges that simulate what you are going to get in a war. That has been our prime goal.

We have not achieved that on all systems today. The reason we haven't is that some of them, while they are simple to operate, are complex to maintain. So, we are paying a lot of attention to our spares to make sure we are buying enough to keep them in operation. We are improving them along with test equipment to make sure we can maintain them on the battlefield.

I am going to talk later about two new pieces of equipment we are getting ready to put in that design. We do take supportability seriously. Just as an example of one thing we are doing. In the past when we improved a piece of equipment, the first thing we always looked for was how do we get more capability?

We never looked at how to make it simpler to maintain, how to reduce the operational cost of operating it over a 20-year life cycle? Today on every piece of equipment which the project managers and the user group in TRADOC want to improve.

We say, first of all, you tell us the improvement you want. Now, you tell us how you are going to improve the reliability of that piece of equipment so that our costs are less and that we can maintain it on the battlefield and make it self-financing. We think that will have a big payoff.

STANDARDIZATION

Senator **Kennedy**. In this whole area are we looking at the issue of standardization with our allies as well and does that fit into the kinds of systems that you have outlined here?

General **Wagner**. Our greatest standardization is in ammunition. We can fire almost all of the ammunition whether it is foreign or whether it is domestic.

They sometimes have different safety criteria on fuses, and so forth, but we check them in peacetime and when the war starts we will fire that particular ammunition.

We are looking at standardizing such things as track. We have standard guns today. As much as possible we do that.

As far as getting down and saying every component is interchangeable, no. We are assuring that wherever possible in our communications gear it will interoperate with the other. That does not always happen. A good example of that is our tactical radio today. It is not going to communicate and net with the German new tactical radio when it is in an antijam hopping mode. It will do it in a single channel mode. They have a cuing device so when they want to speak to us, they cue us and we go into the nonhopping mode. It is not as good as antijam. We consider that in every piece of equipment.

Senator **Bingaman**. Is that the same one that we can't communicate with the Air Force with?

General **Wagner**. We can communicate with the Air Force.

Senator **Bingaman**. Which is the radio I read about last week that the Air Force is having to change and spend $30 million to improve, to make it interface with the Army?

General **Wagner**. I will have to provide that for the record, sir. They use, some of the same radio systems in the Air Force. They will use our AirLand SINCGARS which is the standard FM radio used on the battlefield.

I will have to check the rest of that for the record.

[The information follows:]

SATELLITE COMMUNICATIONS TERMINALS

General **WAGNER**. I believe the issue you are referring to is the need to modify the Army tactical satellite ground terminals AN/TSC-85A and AN/TSC-93A. This modification would incorporate a new low rate multiplexer in those satellite terminals. This change will provide additional interoperability with Air Force satellite terminals and provide for more efficient use of scarce satellite channel capacity. It should be noted that interoperability between Army and AF terminals currently exists through battlefield switching equipment.

IFF

Chairman **GOLDWATER**. I think the difficulty might be in the Army and the Air Force, also the Navy, in this communication equipment. Right now we have a problem with the identification, friend or foe [IFF] which the Germans are holding out on. They previously didn't want to use our IFF and we are trying to work that out.

I don't know if the Army, and Dr. Sculley are very familiar with that particular communicatins problem, the IFF? Are you?

Dr. **SCULLEY**. Yes, sir; it is a massive problem which we with the Air Force do not have a solution for. It is currently under study.

I am at this point in time not free to give you any encouragement that we have moved forward satisfactorily in resolving the IFF problem.

General **WAGNER**. We do use the same IFF modules today that the Air Force uses, but the principal problem is with the allies to get all the IFF's working together. We are negotiating that with them.

Chairman **GOLDWATER**. The Germans have not agreed?

General **WAGNER**. Yes.

Senator **LEVIN**. Does the Defense Department have all the authority it needs to correct the compatability or inoperability problem?

Did Congress give you any authority to solve this problem?

Dr. **SCULLEY**. I feel that we in the Defense Department have as much authority as we need. Obviously, it is not a unilateral decision on the part of the United States on the interoperability.

Senator **LEVIN**. I am talking among the services.

Dr. **SCULLEY**. Yes; we do have the authority. It just takes sitting down around a table in a room and resolving it, yes, sir.

Senator **LEVIN**. Thank you.

General **WAGNER**. More has been done in that arena, sir, last year particularly with the Air Force than at any time in recent history.

Chairman **GOLDWATER**. I might say for your information that the joint communications area is scheduled for the 14th of March.

LIGHT DIVISION MODERNIZATION

- HMMWV
- M16A2
- NIGHT VISION EQUIPMENT
- IMPROVED 81mm MORTAR
- UH-60
- STINGER
- AAWS
- M9-ACE

General WAGNER. Finally, the light division needs some of the key pieces of equipment shown on this chart. You see that it is the same type of equipment that is going in the other divisions.

The HMMWV vehicle, the M16A2 rifle which is the standard infantry rifle today, and night vision equipment which is going in greater numbers, but the same type of night vision equipment we will put in our other divisions. All light divisions will have improved 81-millimeter mortars.

Finally, the Black Hawk UH-60, Stinger air defense system, the new antitank weapon system for the Army and M-9 [ACE]. All we have to do is make sure that the distribution is proper so that they get the items of equipment when they are activated and can become combat capable.

Senator LEVIN. I have one question on the light division modernization issue.

I understand that you were supposed to have a study on equipment needs of the light division delivered to the Congress by February 1 of this year. I don't know that we have received that study.

General WAGNER. You have not, sir. It is in final draft now. You should receive it in a couple of weeks.

Senator LEVIN. Will we be receiving that before we vote, assuming we follow the ordinary timetable?

General WAGNER. Yes.

Senator Levin. There seems to be a lot of these requests depending on your overall plan which we have not received yet. A couple weeks is your goal?

General Wagner. Yes, sir; if I went back and looked at the procurement requests 3 years ago and looked at the request today, there has not been a significant increase in any particular item with the exception of night vision equipment that is going in in larger numbers.

It is primarily a redistribution from within the procurement and currently available assets.

READINESS

What have we done in readiness? Thanks to the support of the Congress during the last 4 years, we have made significant improvement in the fighting capability of our Army.

EQUIPMENT/MODERNIZATION

EQUIPMENT MODERNIZATION

(1980-1984-1986)

COMBAT EQUIPMENT

	1980-84	1984-86	TOTAL PROGRAM
NEW TANK (M1)	+3823	+1680	7467
FIGHTING VEHICLES (BFVS)	+2560	+1371	6882
ATTACK HELICOPTERS (AH64)	+171	+280	675
ARTILLERY ROCKETS (MLRS)	+89K	+119K	362.8K
AIR DEFENSE MISSILES (PATRIOT)	+1150	+1025	5977

SUPPORT EQUIPMENT

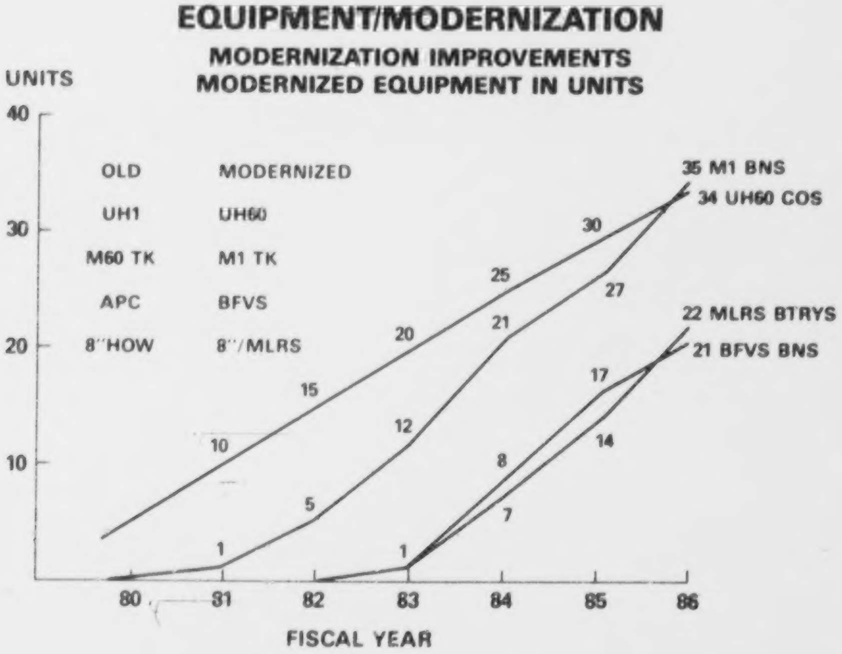
	1980-84	1984-86	TOTAL PROGRAM
UTILITY HELICOPTERS (UH60)	+747	+164	1107
5-TON TRUCKS	+48K	+6K	101K
10-TON TRUCKS	+7K	+2K	16K

For example, Dr. Sculley touched on this, so I am not going to go into a lot of detail on it, but we have finally got these new items of equipment in large numbers that we need to outfit our forces to fight the AirLand battle.

When we have put those items of equipment together in a division, and then done war gaming, we have found, for example, if you took the 3d Mechanized Division in Germany, the combat capability of that division today with its M1's and with its Bradley's is about 40-plus percent greater than that same division was 3½ years ago when they first started modernizing.

That improvement does not show up in unit readiness reports you read about in the newspaper all the time because what they measure is the equipment on hand, the number of soldiers assigned and then the availability of it on a daily basis.

So, if you replace a tank with another tank, you are not going to show up on that report as having greater capability. You really have to go into a war game using the threat. In fact, in the war game we are using the 1990's Soviet threat and we find the 3d Mechanized Division is about a 40-plus-percent more capable division.



Just to give you an example of some of the organizations we have fielded, we have fielded 35 or are in the process of fielding 35 M1 battalion equivalents; 19 of those are out there fully operational today. The rest of them are in the process of being converted and will be completed by the end of 1986.

MLRS

If you take a look at the MLRS, we didn't have any of these in our force structure prior to 1982. Now, by the end of 1986, we will have fielded 23 [3 POMCUS] of our multiple launch rocket systems [MLRS]. So, there has been a tremendous increase in the capability through those units.

Senator BINGAMAN. Those M1 battalions are all in Europe?

General WAGNER. No, sir; 11 are in Europe and 8 of them are in the United States; 1 of those 8 is in the National Guard. It is a round-out battalion of the 2d Armored Division.

MANAGING MODERNIZATION

Finally, how are we managing this modernization? I was in this business about 7 years ago and when we put together a procurement budget and an R&D budget in those days we didn't tie it to the force structure as we do today.

We looked at production rate. We looked at the available forces. Then we bought the piece of equipment. In some cases we then figured out exactly how that was going to be fielded and in what unit it was going to be fielded.

We don't do that today. Today when we buy a piece of equipment, we look at how we field a total unit. When we get ready to buy 58 tanks and the float that goes with it, which is 62 tanks, we say before we can field it as a battalion, we have to have trucks to go with it; we have to have the test sets to go with it; and we have to have, in the case of the M1A1, which is our new 120-millimeter tank, [deleted] of ammunition when we put that tank on the ground in a unit so that it has the same capability to fight as the M1 today.

Until we have all that package put together, we are not going to field it. When we put our budget together, we do our best to balance all of that. We are getting better all the time in that respect.

I wouldn't stand here today and say there is 100 percent balance because we will never achieve that. There are certain production rates, you can't go below on some items in a particular year.

We do our best to develop a balanced program that fields systems by units.

To give you an idea what the 1986 budget will do, these are the types of units that we will be able to field. For example, 8 attack helicopter battalions, 15 armored battalions with Abrams tanks, 4 divisions modernized with our new ground radio, SINCGARS, and 5 artillery battalions with the MLRS.

We make sure in the program we have all pieces of equipment to go with them. The Army Materiel Command's mission is to put the equipment together as a package, move it to that battalion, and train that battalion. Then they are ready to go to war to fight as an entity rather than to fight with individual items.

FY86 PROCUREMENT INVESTMENT

8 ATK HEL BN EQUIVALENTS
MODERNIZED WITH APACHE
1178.2 144 AH-64

5CBT SPT AVN CO EQUIVALENTS
MODERNIZED W/BLACKHAWK
$267.0 78 UH-60

15 ARMOR BN EQUIVALENTS
MODERNIZED W/ABRAMS
$2108.8 840 M-1

12 MECH INF BN EQUIVALENTS
MODERNIZED W/BFVS
$1007.0 716 M-2/M-3

4 DIV EQUIVALENTS
MODERNIZED W/SINCGARS
$231.3 16K RT'S

WHEEL VEHICLE MODERNIZATION
$326.0 13K HMMWV
$225.3 2K 5-TON TRUCKS

NIGHT VISION DEVICES
$9.9 3.7K AN/PVS-4
$65.0 14.9K AN/PVS-5

2 HVY & 1 LT ENG EQUIVALENTS
MODERNIZED W/ACE
$85.0 70 M-9

ANTI-ARMOR MISSILES
20K TOW II $226.9
6K HELLFIRE $250.7

34 ARMOR/MECH INF BN EQUIVALENTS
MODERNIZED W/RECOVERY VEHICLES
$215.8 240 M88A1

5 ARTILLERY BN EQUIVALENTS
MODERNIZED W/MLRS
44 LNCHRS/72K MISSILES $64.5+Assoc Cost

AMMUNITION
$1484.2 WAR RESERVES
$719.2 TRAINING

We think this is a major change we have made over the last couple of years and we think it will have a high payoff in the future.

MULTIYEAR PROGRAMS
(FY 82-85 STARTS)

	PROGRAM	SAVINGS $ (M)	FY'S
FY 82:	M1 FIRE CONTROL	131.1	82-85
	BLACKHAWK AIRFRAME	81.1	82-84
	ALQ-136 RADAR JAMMER	34.6	82-84
FY 83:	T700 ENGINE	75.1	83-85
	MLRS	209.1	83-87
	M60 THERMAL SIGHT	56.0	83-85
	BFVS (COMPONENTS)	118.7	83-85
	PLRS	57.4	83-86
	HMMWV	88.0	83-87
FY 84:	NO NEW STARTS		
FY 85:	BLACKHAWK AIRFRAME	129.5	85-87
	CH-47D	153.4	85-89
	SHOP EQUIPMENT	74.3	85-89
	5-T TRUCK	60.0	85-87
	BFVS (TURRET DRIVE)	16.6	85-87
	TOTAL SAVINGS (FY 82-89)	1,284.9 (M)	

In previous multiyear contracts we expect savings of about $1.3 billion. We are going to continue to push for multiyear procurements where they make sense. We think that is the way to do business and to get more for the dollar.

MULTIYEAR PROGRAMS
FY 86 STARTS

PROGRAM	SAVINGS $ (M)	FY'S
M1 FIRE CONTROL	96.1	86-89
M1 ENGINE	159.8	86-89
M1 CHASSIS	393.7	86-89
T700 ENGINE	71.1	86-88
M9 ACE	31.2	86-90
M1 COMPUTER/CONTROL PANEL	7.3	86-89
BRADLEY TRANSMISSION	25.5	86-88
TOTAL SAVINGS: (FY 86-90)	784.7	

In looking at the balance of our program, these are the 1986 multiyear programs that we are looking at right now. A little over three-quarters of a billion dollars is expected to be saved if we are allowed to execute these particular multiyear programs.

I will talk about multiyear a little later that is causing problems on MLRS.

If we can continue these types of programs with your support, it gives stability to the Army. It means we can field the unit better and we feel there are significant savings.

Dr. SCULLEY. I might add that the real savings from multiyear contracting are not the 10 percent that is shown up front, but the contractual commitment, the commitment on the part of the Department of Defense and the Congress that authorizes it and appropriates the money and the commitment that the contractor can make with his subs.

That contractual instrument is a great barrier to tinkering that causes stretchouts that are highly uneconomical. To be very candid about it, it also on occasion protects us from ourselves as we tinker with the budget.

So, it has worked and the real savings, I think, are a matter of record.

Senator BINGAMAN. These are all fixed-cost contracts?

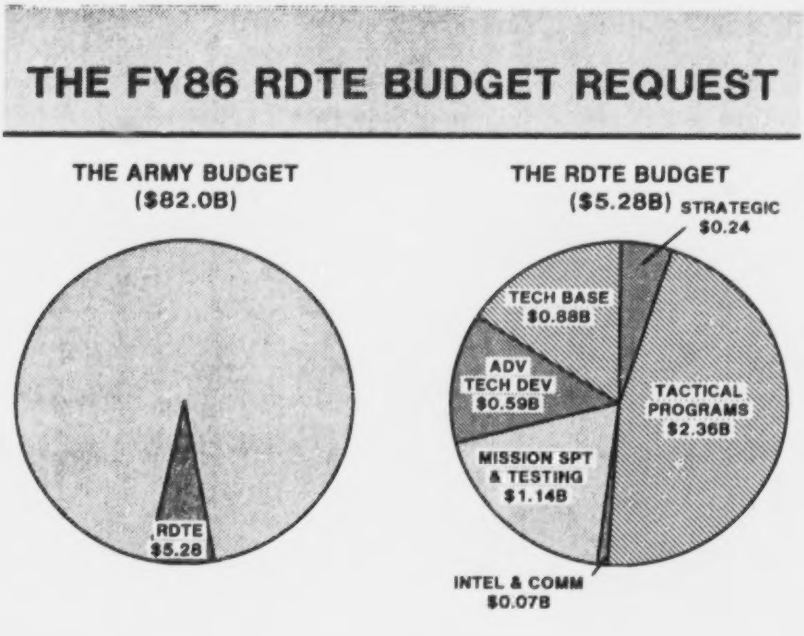
Dr. SCULLEY. That is correct. With perhaps a provision of escalation tied to inflation on specific items. But they are fixed-price contracts.

Senator LEVIN. Will you be coming in with those or have they already been submitted?

General WAGNER. The documentation has been submitted. It goes through the normal documentation process over here to get the approval before we can start them. We have to show the percentage of savings.

The principal problem we have then is that with the available dollars we have in our investment account which is primarily research, development, and procurement, we must assure that we achieve the best balance between R&D and procurement to counter the future threats.

On the procurement side we need to get balance between sustainability of force which is the capability to fight over a long period of time and then modernization of the force. That is what we try to do.



THE FY86 RDTE BUDGET REQUEST

THE ARMY BUDGET ($82.0B)

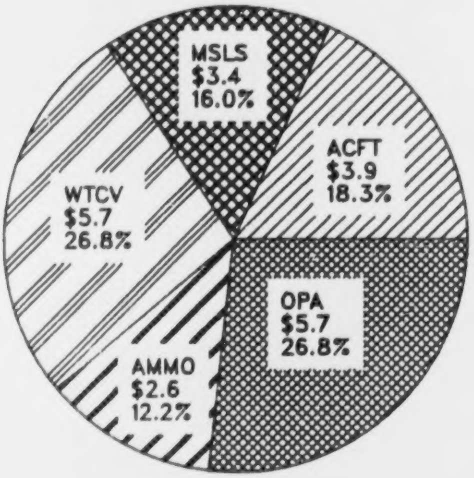
THE RDTE BUDGET ($5.28B)

This is the way it breaks down now. This is what you will see in this year's budget. It is about $5.28 billion in RDT&E. You will see a lot of that is in the tactical programs, a little bit in strategic.

Mr. Lewis will talk about our technology base and some of the things we are doing there.

PROCUREMENT APPROPRIATIONS

FY 86 TOA = $21.4 B



Finally, in procurement this is our program today and you can see that in our weapons, track and combat vehicles it is pretty uniform, 26.8 percent; missiles 16 percent.

OPA, that is Other Procurement Army, includes trucks, support equipment, and communications equipment that we didn't buy enough of in the past. So, there is a significant increase, particularly in communications equipment this year to give us the command and control capability we so badly need.

What I am going to do now is to discuss some of the key systems that are going in our Army. I am going to hit the highlights only.

M1/M1A1 ABRAMS TANK

- FY86 - EIGHTH YEAR OF PRODUCTION
- 4,168 PROCURED THROUGH FY85
- EIGHTEEN BATTALIONS FIELDED (11 USAREUR, 7 CONUS)
- PROVEN IN EXTENSIVE TESTING; REFORGER 1982-83-84
- SUCCESSFUL M1A1 DSARC DECEMBER 1984; FULL PRODUCTION FY85 BUY
- FIRST M1A1 DELIVERY AUGUST 1985
- FY86 RDT&E: CONTINUES EFFORT ON BLOCK 2 IMPROVEMENTS
- FY86 PROCUREMENT: 840 ABRAMS TANKS

If you have a particular question, I will answer.

Basically what I want to do is to discuss those key points that I think you will be interested in.

M1 TANK

The key thing on the M1 tank is that we have a full production go-ahead for the M1A1 tank. [Deleted].

It is more survivable than the current tank by improvements in the NBC system which now has an overpressure system on it, and improved armor. We worked hard on the reliability to make sure it is up to the standards we want.

Two things you may have heard about.

First of all, accuracy of the 120. We initially had some problems in accuracy and found out part of it was the procedure in firing. Other problems were in the fire control. Our final developmental testing and operational testing on it showed we were getting a better hit probability with this 120-millimeter gun than we were with our current 105.

A final point is the key area of survivability. The 120 has a combustible case. A lot of people have nightmares about combustible ammunition because they remember some of the problems we had with the early ammunition on the M551 Sheridan. That is not true with this particular combustible ammunition.

You don't have to put a special baggy around it to make sure it is safe to use in the turret. It is working out very well. However, it is a bigger round, it is more volatile in the storage compartment.

We had to redesign the storage compartment doors so that if we had a catastrophic explosion back there caused by penetration of an enemy round, it would not blow in the crew compartment and kill the crew.

We have solved that problem now. We have gotten it down to the point where there is very minor leakage of gas, but it is so insignificant, it will not have any effect on the survivability of the crew.

Sometimes to meet the Surgeon General's standards we may go too far. Some of the noxious gas that came in there would give you pneumonia. As a tanker I would rather catch pneumonia than burn up if the tank goes up. We solved that problem and those gases are not going in there today.

ABRAMS FINANCIAL SUMMARY

PROGRAM UNIT COST
(CONSTANT FY86 $)

DEV EST FY72	2.24
FY85	2.77
FY86	2.77

$(000)

COST GROWTH

FY85-86	0
TOTAL	23.7

	FY84 & PRIOR	FY85	FY86	FY87	TO COMPLETE	TOTAL
RDT&E	1149.6	107.4	25.8	28.1	22.8	1333.7
WPN SYS PROC*	8028.0	1878.8	2204.3	2262.0	4299.3	18672.4
QUANTITY BUY	3,328	840	840	840	1,619	7,467

*INCLUDES INITIAL SPARES

$(000,000)

There is no cost growth from what we projected last year. You approved the M1A1 last year in the same numbers we have in this year's budget. This tank does cost $204,000 more than the current M1 tank. If you look at it from cost effectiveness, it is many times more effective on the battlefield in its capability, particularly in an offensive situation.

BRADLEY FIGHTING VEHICLE

This is the Bradley fighting vehicle, the partner of the M1 that will go into the mechanized infantry. I would like to point out on this that we have 1,590 already fielded today. The troops like it. It is doing very well.

BRADLEY FIGHTING VEHICLE SYSTEM HIGHLIGHTS

- FY86 - SEVENTH YEAR OF PRODUCTION
- 2955 PROCURED THROUGH FY85
- 2D ARMORED DIVISION (FORT HOOD), TWO BRIGADES, 3D INFANTRY DIVISION (EUROPE) AND ONE NATIONAL GUARD BATTALION FIELDED
- INITIAL PRODUCTION TEST (IPT) EXCEEDED RAM GOALS BY 75%
- SYSTEM HAS PERFORMED WELL ON MAJOR EXERCISES (REFORGER, NATIONAL TRAINING CENTER)
- TROOPS LIKE THE VEHICLE AND ITS CAPABILITIES
- FY86 RDTE REFURBISHING EARLY TEST VEHICLES AND CONTINUING EFFORT ON BLOCK IMPROVEMENTS
- FY86 PROCUREMENT: 716 VEHICLES

The key thing that hits the newspapers, is we did not test it for survivability: that the crews burn up in it when it is hit by a shaped charge warhead. Any metal has a level of vaporific effect if you put a large enough shaped charge into it.

When the jet comes through, the small displaced metal has a tendency to burn. All the testing done today shows you will be killed first by the blast and fragments before you have a problem with the vaporifics.

We did a lot of testing on this and it did meet all the standards it was designed against. However, we didn't use warheads that we knew would completely destroy it. Currently, we are in an extensive program to do more testing on the vehicle and then, if possible, to improve its survivability in the future through applique armor, spall screens on the inside and things of that nature.

That is a product improvement that has always been planned. The testing will continue over the next 18 months.

Dr. SCULLEY. I may add at this point, if I may, that I jumped into this full-up testing issue on the Bradley sometime last July when it was brought to my attention. There will be full-up destructive testing of a fully loaded, fully fueled Bradley vehicle later this year, but only after component testing is completed. We must understand the factors that cause a 25-ton vehicle that was not designed to resist antitank weapons to fail. We must understand the components of failure, to improve the vehicle.

That is the purpose of the testing program. I fully expect that a tank round shot into this lightly armored fighting vehicle will have catastrophic results. That is to be expected. But we will understand the components of failure.

Senator GLENN. Was this a change after the thing was initially started to be procured? Was it a change in mission, change in design?

Or was it poor specs to begin with? What caused this?

General Wagner. The specs put out were the specs that we wanted to counter on the battlefield. We wanted it to stop 14.5-millimeter round which is one of the most common weapons. We wanted to make sure antipersonnel and small antitank mines would not kill the crew through the bottom.

We wanted to make sure in the front we could stop larger rounds. It will do that today. The Bradley is protected against 12.7mm all around, 155mm air bursts and small land mines.

Senator Glenn. Were these in the original design?

General Wagner. Yes; there is no question that there is no piece of equipment that is invulnerable. We knew if it was hit by a big enough shaped charge warhead, you could destroy that vehicle. You can do it today. I can destroy any one tank with a large enough warhead.

We think with the weight limitation on it and the crew size, we probably have the best protection we could get for the weight and available materials at that time.

That does not mean we are not going to improve it, because there are more effective materials being designed every day to protect it.

Senator Warner. What is your total program buy?

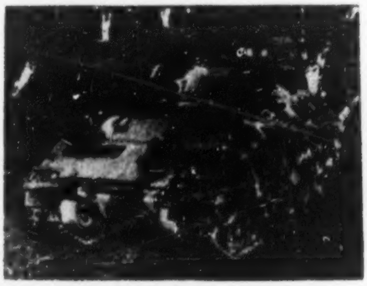
General Wagner. Just over 6,000, sir.

Dr. Sculley. 6,882.

BRADLEY FINANCIAL SUMMARY

PROGRAM UNIT COST
*(CONSTANT FY86 $)

DEV EST FY72	.8154
FY85	1.6281
FY86	1.6057



COST GROWTH

FY85-86	-1.38%
TOTAL	+96.92%

	FY84 & PRIOR	FY85	FY86	FY87	TO COMPLETE	TOTAL
RDT&E	507.5	*12.0	2.2	0	0	521.7
PROC COST	3701.2	1062.5	1119.0	1332.1	3531.4	10751.2
QUANTITY BUY	2300	655	716	870	2341	6882

*ADJUSTED FOR SAR

$(000,000)

Senator Thurmond. Mr. Chairman, I have one question.

What is the survivability of the Bradley compared to the M113 personnel carrier?

General Wagner. It is much more survivable. I can penetrate the side of the M113 with armor-piercing .50 caliber. We are improving the M113 because it is going to be out there in large numbers for an extended period of time.

We are looking at putting applique armor on the outside. Additionally, we are using external fuel tanks and putting spall liners on the inside. The Bradley was designed to be much more survivable than the M113.

Senator **Bingaman**. How extensive or widespread are these antitank weapons on the Soviet side?

General **Wagner**. They are extensive on the battlefield. A lot of how you defeat those is the tactics.

First of all, you suppress them where you can with artillery fire.

Second, this fighting vehicle is really a fire team of an infantry rifle squad. He can stand off at 2,000 meters and destroy an equivalent vehicle in the Soviet Army. With the TOW missile he can stand off 3,750 meters and destroy enemy tanks.

When he goes into the area where there are a lot of anti-tank weapons we will use tactics to suppress the enemy infantry and the antitank weapons, in some cases we have to dismount and clean them out.

To move rapidly around the battlefield we feel the squad should stay mounted. That is one reason that the crew on the inside now has vision blocks and can fire outside if the enemy pop up out of their holes and try to take it at short range.

Senator **Levin**. Why does it takes so long for the survivability features to be installed?

General **Wagner**. Part of it, sir, is that we still have in the design mode some of the applique armor and things of that nature that we would like to put on in the future that will give it more survivability.

For example, we will show you a bit later some new composites that will give it a better capability. Some items are still in development and were not available at the time Bradley was built.

Senator **Levin**. Can't we accelerate Bradley so that we do this before 1989?

General **Wagner**. This is a program we are looking at to accelerate based on the development effort and the results of the survivability tests. We must make sure the improvements give us the survivability we are looking for.

MULTIPLE LAUNCH ROCKET SYSTEM (MLRS)

- FY86 - SEVENTH YEAR OF PRODUCTION
- 116,322 ROCKETS, 304 LAUNCHERS PROCURED THROUGH FY85
- 362,832 ROCKETS, 348 LAUNCHERS TOTAL BUY
- FOLLOW-ON EVALUATION JUL-AUG 84 WAS SUCCESSFUL
- MULTI-YEAR CONTRACT AWARDED - SEP 83
- EIGHT BATTERIES FIELDED TO DATE
- NO RDTE IN FY86
- FY86 PROCUREMENT BUYS 72,000 ROCKETS, 44 LAUNCHERS

This is your multiple launch rocket system. This system has greater effect on field artillery than any system fielded since World War II. It gives you the capability of putting more firepower on targets with a small crew in a short period of time than anything we have ever had before.

You can take a battery of these particular systems and put more explosive ordnance in an area with one salvo than you can put in with three battalions, one round of 155 artillery.

That does mean you have to reload them, but it gives you a tremendous surge capability. That was a new learning experience and required new doctrine for the artillery. When it was first designed, if you asked an artillery man what was the mission, he would say it is counterbattery fire to destroy other artillery.

The principal mission of the artillery is close support of maneuver forces. This weapon has the accuracy today to give you that close support.

The accuracy checks we have made on it after some software changes have fixed the problems that we had initially when there was a slight accuracy problem. It was never really an accuracy problem in the real sense because all you had to do was make modification in the firing tables.

Today it is built right into the software and it takes care of that problem for you.

BLACK HAWK

- FY85 AWARD OF MULTI-YEAR PROCUREMENT CONTRACT (FY85-87) WILL SAVE $129.5M
- 563 BLACK HAWKS DELIVERED END FY 84
- COMPLETED FIELDING TO EUROPE, KOREA AND PANAMA
- FIELDING TO WESTCOM IN PROCESS FOLLOWED BY CONTINUED FIELDING TO FORSCOM
- 699 PROCURED THROUGH FY85 FDP
- FY86 PROCUREMENT: $486.2M; BUYS 78 BLACK HAWKS
- FY86 REQUESTS FOLLOW-ON ENGINE MULTIYEAR PROCUREMENT (FY86-88)

BLACK HAWK FINANCIAL SUMMARY

PROGRAM UNIT COST
(CONSTANT FY86 $)

DEV EST FY71	5.472
FY85	6.928
FY86	6.559

$(000,000)

COST GROWTH

FY85-86	-5.3%
TOTAL	+19.9%

	FY84 & PRIOR	FY85	FY86	FY87	TO COMPLETE	TOTAL
RDT&E	519.3	0	0	0	0	519.3
WPN SYS PROC	3257.9	476.6	486.2	394.5	1490.7	6105.9
QUANTITY BUY	613	86	78	78	252	1107

$(000,000)

This is the Black Hawk. I point out that this program is on track. We have a significant savings in a multiyear contract and we are going to continue that. This is one of the prime examples where we will save a lot of money by going the multiyear procurement route.

PATRIOT MISSILE SYSTEM

- HIGHLY SUCCESSFUL FOLLOW-ON EVALUATION
- FOUR MISSILES FIRED - FOUR TARGETS DESTROYED
- FIRST US PATRIOT BATTALION TO EUROPE - JAN 85
- US/GERMANY COOPERATIVE AIR DEF AGREEMENT IMPLEMENTED
- US CONGRESS/GE BUNDESTAG APPROVED THIS AGREEMENT
- FIRST PATRIOT FMS CASE SIGNED - NETHERLANDS
- FY86 IS PATRIOT'S SEVENTH YEAR OF PRODUCTION
- FY86 PROCUREMENT: BUYS 12 FIRE UNITS AND 585 MSLS
- FY86 RDT&E: CONTINUES R&D FOR P^3I PROGRAM

This is Patriot. It is our primary high altitude antiaircraft defense, the first system that has given us a real high altitude capability in a long time. It can track up to [deleted] targets per battery and engage up to [deleted] targets at a time.

The key thing about this is that we had problems with it that we told you about last year. We were involved in a very extensive test program to make sure we were on track and that those problems were solved.

It successfully passed its follow-on tests and the first unit is in Europe today. For example, we fired four missiles simultaneously and it destroyed four targets.

The key thing about this program is that it is now a stable program and we need to keep it stable. We need to continue the production rate, both in fire units and missiles. If we don't do that, we are going to have a significant cost increase and, second, we are going to have a real problem in trying to upgrade the NATO capability because we have signed an agreement with our NATO allies that they are going to field this system. Reductions would drive their costs up and it would cause us to have to renegotiate all of those agreements.

PATRIOT FINANCIAL SUMMARY

PROGRAM UNIT COST (CONSTANT FY86 $)

DEV EST FY72	53.8
FY85	125.0
FY86	129.9

COST GROWTH

FY86	3.7%
TOTAL	141.5%

		FY84 & PRIOR	FY85	FY86	FY87	TO COMPLETE	TOTAL
	RDT&E	2027.7	61.1	53.1	38.8	192.4	2373.1
PROC	WPN SYS	3237.3	960.8	983.4	1055.2	3141.2	9377.9
	INIT SPAR ES	279.3	85.0	105.0	105.6	218.9	793.8
	MODS	2.0	11.8	21.5	58.0	198.4	291.7
QTY	FIRE UNITS	43	12	12	12	24	103
	MISSILES	1150	440	585	700	3102	5977

$(000,000)

Again, there is only a minor increase in cost caused by a slow down in the production rate to reach the stable level we have today. We believe from now on it will stay on track.

CH-47D (CHINOOK)

- FY86 - 6TH YEAR OF PRODUCTION
- MODERNIZE THE ARMY CARGO FLEET (436 AIRCRAFT)
- EXTEND FLEET LIFE (20 YEARS)
- LOWER OPERATING COSTS (27%)
- INCREASE CAPABILITY (52%)
- IMPROVE RAM, FLIGHT SAFETY, SURVIVABILITY
- 10C MET ON SCHEDULE (FEB 84)
- PROGRAM ON SCHEDULE AND BELOW COST SINCE INCEPTION
- FY86 PROCUREMENT: $371.5M MODERNIZES 48 AIRCRAFT

This is the CH-47D Chinook. This is an example where we have taken an older piece of equipment and have product improved it so that it will given us a capability into the year 2000. We doubled its lift capability and increased its reliability.

It is a good piece of equipment. With this upgrade, we believe that it will give us the medium lift capability that we need.

CH-47D FINANCIAL SUMMARY

PROGRAM UNIT COST
(CONSTANT FY86 $)

DEV EST FY75	5.59
FY85	7.16
FY86	6.97

$(000,000)

COST GROWTH

FY86	-2.65%
TOTAL	+24.7%

	FY84 & PRIOR	FY85	FY86	FY87	TO COMPLETE	TOTAL
RDT&E	113.5	0	0	0	0	113.5
WPN SYS PROC	968.6	411.0	371.5	305.5	1054.3	3110.9
QUANTITY BUY	88	48	48	48	204	436

$(000,000)

Also, again, we are on a stable production track of continuing that reduction in cost. Growth here and back on our multiyear, we are going to have to come back and tell you on this one that we have to have you relook it because both the multiyear and the single year dropped so much during the negotiation that when you work it out percentagewise the dollars saved were not as great as they were before, but when you base it against the two, the percentage of savings is even greater.

ARMY CHEMICAL PROGRAM HIGHLIGHTS

- CORRECTS SIGNIFICANT DEFICIENCIES IN NUCLEAR, CHEMICAL-BIOLOGICAL (NBC) DEFENSE
- REPLACES AGING, LESS EFFECTIVE NBC DEFENSIVE MATERIAL
- DEVELOPS IMPROVED NBC DEFENSIVE MATERIAL
    - BETTER CAPABILITY
    - LESS MANPOWER AND LOGISTICALLY DEMANDING
    - SOLDIER PERFORMANCE IMPROVES
- DEVELOPS AND BEGINS INITIAL PRODUCTION OF A CREDIBLE, MODERN CHEMICAL DETERRENT CAPABILITY
- DEMILITARIZES UNUSABLE, POTENTIALLY HAZARDOUS CHEMICAL MUNITIONS
- DEVELOPS OBSCURANTS TO INCREASE THE SURVIVABILITY OF US FORCES

The Army chemical program is an area that I want to touch on very quickly for one reason. We are in pretty good shape on one part of it, that is, protection of the individual soldier, but we are not in good shape yet in retaliatory capability.

ARMY CHEMICAL PROGRAM FINANCIAL SUMMARY

	FY85	FY86	FY87*	TO COMPLETE	TOTAL
NUCLEAR-CHEMICAL-BIOLOGICAL DEFENSE PROGRAM	664	713	746	N/A	N/A
CHEMICAL RETALIATORY	18	162	127	N/A	N/A
CHEMICAL DEMILITARIZATION PROGRAM	150	132	122	N/A	N/A

* NOTE - DOES NOT INCLUDE OMA FUNDS.

There are three parts of the chemical programs. This is the funding on each. First, the defense program, which is the largest expenditure because we are primarily defensively oriented; second, retaliatory, which is about a fifth of the total, and finally, we have to continue to demil our old munitions.

NUCLEAR-CHEMICAL-BIOLOGICAL DEFENSE (NBCD) PROGRAM HIGHLIGHTS

- DEVELOPS IMPROVED NBCD EQUIPMENT FOR - AVOIDANCE, PROTECTION, RECOVERY
- DEVELOPS IMPROVED MEDICAL CBD - PRETREATMENTS, ANTIDOTES, CASUALTY CARE
- DEVELOPS IMPROVED OBSCURANTS FOR FORCE SURVIVABILITY
- PROCURES IMPROVED CBD MATERIEL
    - IMPROVED PROTECTIVE MASK
    - COLLECTIVE PROTECTION SHELTER
    - LIGHTWEIGHT DECONTAMINATION SYSTEM
    - CHEMICAL AGENT MONITOR
    - RADIACS
- UPGRADES WAR RESERVE STOCKS (CBD CLOTHING, KITS)
- SUPPORTS NBC DEFENSE TRAINING

As far as our defense, if we can design an antidote, that is the answer. We are developing a good protective mask.

ARMY NBC DEFENSE PROGRAM FINANCIAL SUMMARY

	FY84 & PRIOR	FY85	FY86	FY87	TO COMPLETE	TOTAL
EQUIPMENT RDT&E	N/A	187	214	247	N/A	N/A
MEDICAL RDT&E	N/A	165	162	187	N/A	N/A
PROCUREMENT	N/A	77	86	203	N/A	N/A
OPERATIONS AND MAINTENANCE	N/A	129	137	NA	N/A	N/A
ARMY STOCK FUND WAR RESERVE	N/A	86	91	80	N/A	N/A
MILITARY CONSTRUCTION	N/A	20	23	29	N/A	N/A

$(000,000)

This is the breakout in dollars. You can see that we have had an increase in medical R&D over the years to try to break through in that particular area.

CHEMICAL RETALIATORY PROGRAM HIGHLIGHTS

- ESSENTIAL ELEMENT OF CHEMICAL DEFENSE
- RDTE FOR MLRS CHEMICAL WARHEAD
    - COMPLETED 11 TEST FLIGHTS OF NON-TOXIC SIMULANT FILLED ROCKETS
    - TRANSITIONED TO DEMONSTRATION/VALIDATION PHASE OF ADVANCED DEVELOPMENT
    - AWARDED ADVANCED DEVELOPMENT CONTRACT
- COMPLETES PRODUCTION BASE FOR BIGEYE BOMB
- PROVIDES INITIAL PRODUCTION FOR 155MM GB-2 PROJECTILE AND FACILITY FOR BIGEYE VX-2 BOMB

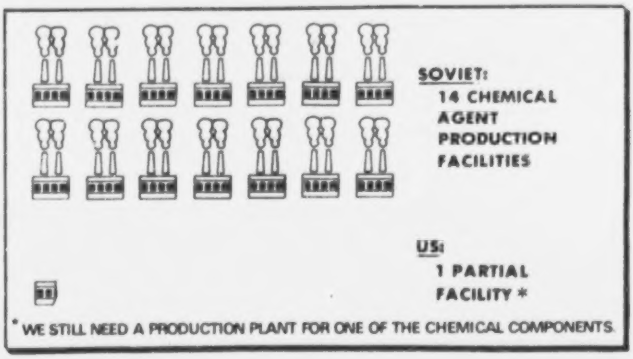
CHEMICAL RETALIATORY PROGRAM FINANCIAL SUMMARY

	FY84 & PRIOR	FY85	FY86	FY87	TO COMPLETE	TOTAL
RDTE	N/A	18	31	27	N/A	N/A
PROC	N/A	0	120	100	100	N/A
MCA	N/A	0	11	0	N/A	N/A

$(000,000)

Retaliatory capability is where we really have our deficiency. We have started our production plant, but we need to go ahead and build the binary capability so that we can counter the threat. Not big dollars, but the key this year, is to get the go ahead and build [deleted] binary rounds for the 155mm howitzers and also complete the facility, both for that round and for the Bigeye bombs for the Navy and the Air Force.

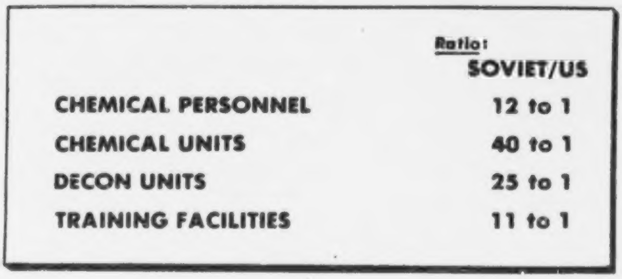
SOVIET/US PRODUCTION FACILITIES


SOVIET:
14 CHEMICAL AGENT PRODUCTION FACILITIES
US:
1 PARTIAL FACILITY *
* WE STILL NEED A PRODUCTION PLANT FOR ONE OF THE CHEMICAL COMPONENTS.

Each of those services have programs for [deleted] production facilities at about $21 million this year. Why do we need that? You know as much about this threat as I do, but I can tell you that the enemy has about 14 production facilities. We don't have one yet.

We have to at least have the capability of putting the enemy in fear of using those rounds.

SOVIET/US COMPARISON



	Ratio: SOVIET/US
CHEMICAL PERSONNEL	12 to 1
CHEMICAL UNITS	40 to 1
DECON UNITS	25 to 1
TRAINING FACILITIES	11 to 1

CHEMICAL PERSONNEL

He is prepared to fight a chemical war. If you look at chemical units, 40 to 1, decon units, 25 to 1. When one look at that, it tells me he plans on fighting a chemical war in spite of what some people are saying.

Senator LEVIN. How about our NATO allies? Do they have units?

General WAGNER. They have very few units at this time.

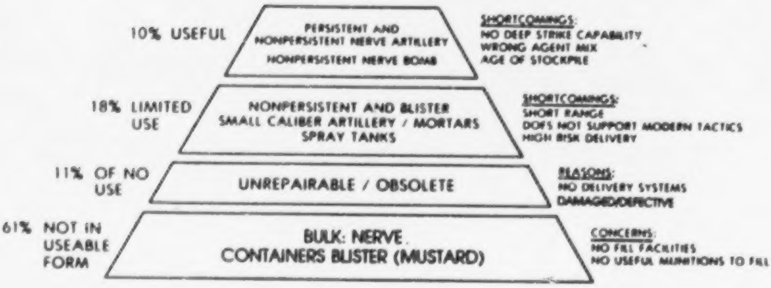
Senator LEVIN. Why is that?

General WAGNER. They have the same problem we have, sir. It is manpower intensive and a lot of the equipment to decontaminate rapidly today isn't available. So, we have concentrated on protecting the man and protecting the piece of equipment rather than spending a lot of money on decon units.

It will cause us a problem in rear areas. That is where we are looking today; is there a better way and less manpower intensive to decontaminate him?

This is how we do it today. If we protect the man, that reduces his fighting capability about 50 percent when you put him in the protective outfit. We have gotten around that in the M1 by putting a cooling vest under his uniform so that he can operate for longer periods of time, but it is a tough problem to fight that way.

RETALIATORY CAPABILITY
(current stockpile)


10% USEFUL
PERSISTENT AND NONPERSISTENT NERVE ARTILLERY
NONPERSISTENT NERVE BOMB
SHORTCOMINGS:
NO DEEP STRIKE CAPABILITY
WRONG AGENT MIX
AGE OF STOCKPILE
18% LIMITED USE
NONPERSISTENT AND BLISTER
SMALL CALIBER ARTILLERY / MORTARS
SPRAY TANKS
SHORTCOMINGS:
SHORT RANGE
DOES NOT SUPPORT MODERN TACTICS
HIGH RISK DELIVERY
11% OF NO USE
UNREPAIRABLE / OBSOLETE
REASONS:
NO DELIVERY SYSTEMS
DAMAGED/DEFECTIVE
61% NOT IN USEABLE FORM
BULK: NERVE.
CONTAINERS BLISTER (MUSTARD)
CONCERNS:
NO FILL FACILITIES
NO USEFUL MUNITIONS TO FILL

—UNITARY—

Ten percent of our stockpile today is useful in only about [deleted]. Most of our rounds are old, all of the unitary type, which means we have to watch them all the time for leakers.

What we need is a binary round which is safe until fired and then it becomes lethal.

Our goal in this year's budget to go to the binary capability so that we have a nonpersistent chemical to use on the front lines, semipersistant to use in the rear and, as you go further to the rear, the persistent that you can put on his logistical facilities and have the deterrent so if he uses it first, we can counter.

Senator GLENN. Will that equipment you showed in the field with the equipment we saw the other day protect against all known Soviet agents?

General WAGNER. We are worried that they may be developing in their laboratory [deleted]. We are working on counters to that. It will counter what they have available today. [Deleted.]

Senator GLENN. Are there any types of agents that will go through that suit and through the mask itself?

General WAGNER. Not that I know of today, no, sir.

Senator LEVIN. I asked whether our allies had decon units. Do we know whether our allies are producing the binary shells themselves?

General WAGNER. They are not.

Senator LEVIN. Why is that?

General WAGNER. First of all, some of them have restrictions against it now. I can tell you that it is being re-looked. For example, [deleted].

In Germany, for example, they have restrictions against that.

Senator BINGAMAN. The stockpile we have today is in this country? Is that accurate?

General WAGNER. I would have to provide that for the record. But that is essentially true. There is some stored out of the country, but I will have to give you the specifics to that.

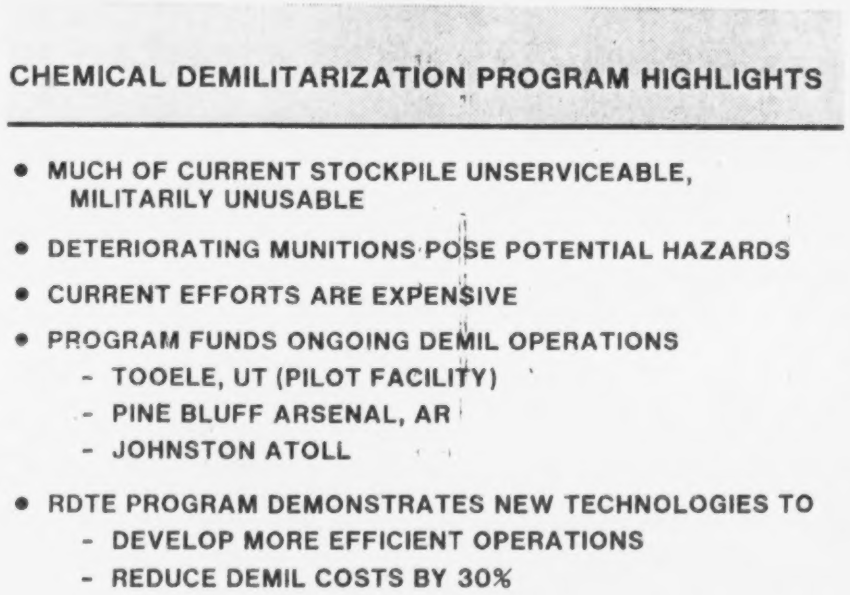
[The information follows:]

Stockpile Restrictions

We have a total of ten locations in which we store chemical munitions. Eight sites are located within the U.S. In addition to these eight sites, we store chemical munitions at Johnston Island Atoll in the Pacific and a small number of chemical munitions in the Federal Republic of Germany.

Senator **Bingaman**. Our expectation would be that if we gear up production of binary chemicals, there will be a change in policy in Europe which will allow some of this to be stored in a way that it could be usable?

General **Wagner**. We are working on that, sir. I know that is one thing we are working on with [deleted].



CHEMICAL DEMILITARIZATION PROGRAM HIGHLIGHTS

- MUCH OF CURRENT STOCKPILE UNSERVICEABLE, MILITARILY UNUSABLE
- DETERIORATING MUNITIONS POSE POTENTIAL HAZARDS
- CURRENT EFFORTS ARE EXPENSIVE
- PROGRAM FUNDS ONGOING DEMIL OPERATIONS
    - TOOELE, UT (PILOT FACILITY)
    - PINE BLUFF ARSENAL, AR
    - JOHNSTON ATOLL
- RDTE PROGRAM DEMONSTRATES NEW TECHNOLOGIES TO
    - DEVELOP MORE EFFICIENT OPERATIONS
    - REDUCE DEMIL COSTS BY 30%

DEMILITARIZATION

We are putting together a program to demil all of the old equipment, a pilot plant at Tooele, one at Pine Bluff and one at Johnston Island, demilitarizing particularly the M55 rockets, and equipment of that nature.

As they get old you can't dump them in the oceans any more. You have to get rid of them and destroy the lethal chemical. That is not cheap. We are looking particularly at the facility out at Tooele for ways of doing that cheaper.

These are the dollars that are in demilitarization programs.

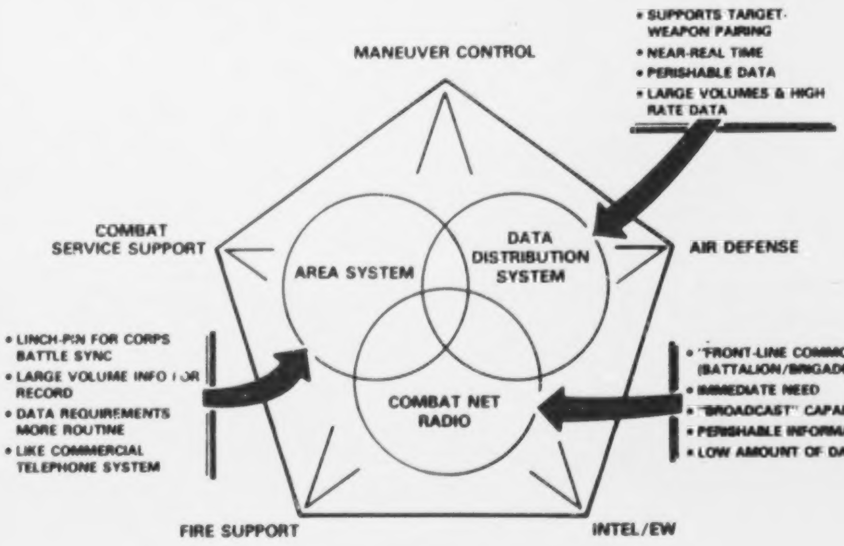
CHEMICAL DEMILITARIZATION PROGRAM FINANCIAL SUMMARY

	FY84 & PRIOR	FY85	FY86	FY87	TO COMPLETE	TOTAL
RDTE	NA	8	10	6	NA	NA
OMA	NA	96	66	NA	NA	NA
MCA	NA	46	7	40	NA	NA
PAA	NA	0	49	75	NA	NA

$(000,000)

Now I would like to take a look at one of the key essential items for fighting the AirLand battle. That is the area of communications systems on the battlefield. A lot of people don't understand that communicating on the battlefield is made up of several parts.

WHY 3 TACTICAL ARCHITECTURES


MANEUVER CONTROL
• SUPPORTS TARGET-WEAPON PAIRING
• NEAR-REAL TIME
• PERISHABLE DATA
• LARGE VOLUMES & HIGH RATE DATA
COMBAT SERVICE SUPPORT
AREA SYSTEM
DATA DISTRIBUTION SYSTEM
AIR DEFENSE
• LINCH-PIN FOR CORPS BATTLE SYNC
• LARGE VOLUME INFO FOR RECORD
• DATA REQUIREMENTS MORE ROUTINE
• LIKE COMMERCIAL TELEPHONE SYSTEM
COMBAT NET RADIO
• "FRONT-LINE COMMO" (BATTALION/BRIGADE)
• IMMEDIATE NEED
• "BROADCAST" CAPABILITY
• PERISHABLE INFORMATION
• LOW AMOUNT OF DATA
FIRE SUPPORT
INTEL/EW

COMMUNICATIONS

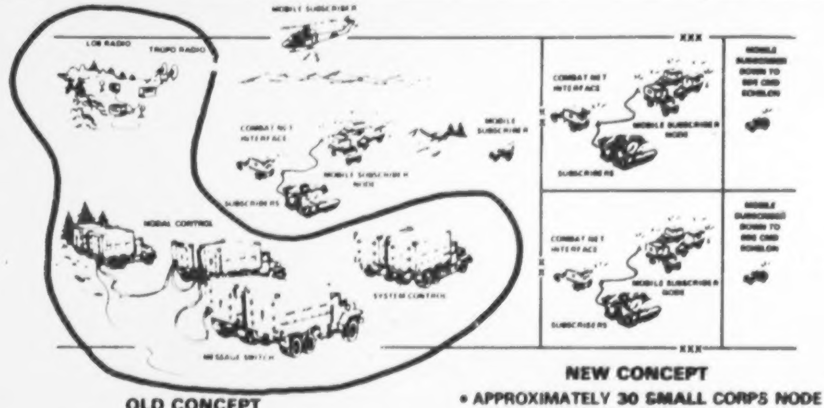
First of all, you have to have communications with your fire support, intelligence, air defense, maneuver forces, and combat service support forces.

The key area I want to consider here is that of the communications system in the corps and division area because it is the one that gives the corps commander the capability of communicating with your units and moving them about on the battlefield.

For example, today when a unit moves to the field, in a division in Germany on an alert, they don't have an area communication system for 2 to 3 days after they go out there unless the area communication system personnel have gone out ahead of time.

Without that you can't rapidly communicate across that battlefield. There are two other systems that we have to take a look at, combat vehicle to vehicle and then the data distribution to route large amounts of data about a battlefield. This chart represents what we call the mobile subscriber equipment.

NEW TRI-TAC CONCEPT OF OPERATION


MOBILE SUBSCRIBER
LOS RADIO
TROPO RADIO
COMBAT NET INTERFACE
MOBILE SUBSCRIBER
MOBILE SUBSCRIBER NODE
SUBSCRIBERS
NODAL CONTROL
SYSTEM CONTROL
MESSAGE SWITCH
XXX
COMBAT NET INTERFACE
MOBILE SUBSCRIBER NODE
SUBSCRIBERS
MOBILE SUBSCRIBER DOWN TO BDE CMD ECHELON
COMBAT NET INTERFACE
MOBILE SUBSCRIBER NODE
SUBSCRIBERS
MOBILE SUBSCRIBER DOWN TO BDE CMD ECHELON
XXX

NEW CONCEPT

- APPROXIMATELY 30 SMALL CORPS NODE CENTRALS (SIGNAL SITES) (5/4T HMMWV'S/50-55 PEOPLE)
- CORPS/DIV EQUIP SAME
- EXTENSIVE MOBILE SUBSCRIBERS (CORPS & DIV)
- TRANSPORTABILITY (ALL BY C141)
  - CORP SIG BDE 373 SORTIES

OLD CONCEPT

- 12 LARGE CORPS NODES CENTRALS (SIGNAL SITES) (2 1/2T & 5T TRUCKS/150-250 PEOPLE)
- CORPS/DIV EQUIP DIFFERENT
- LIMITED MOBILE SUBSCRIBERS (DIV ONLY)
- TRANSPORTABILITY (C-141 & C-5A)
  - CORPS SIG BDE—662 SORTIES

THUS, WE ARE NOW TACTICALLY AND STRATEGICALLY MORE CAPABLE — AND WE GET THERE SOONER...

There is an old concept. It was part of the TRI–TAC system that said we are going to have big corps nodes; 12 of those very manpower intensive elements. The worst part about all of this was that it costs a great deal and it was going to take us 15 years to field it.

We looked to see if there was something available off-the-shelf that we could field faster and give us the capability communicative in the corps and in the divisions down to the brigade level so that we could have an area communications network; in other words, a man on the battlefield, the brigade commander can pick up the telephone in his jeep or tank and speak to the division commander.

With the number of nodes we have in the current MSE concept, it is a very difficult system to jam because if you jam one of the nodes, the phone automatically seeks out another node so that your call goes through; you don't have to change the phone number.

Senator GLENN. When the corps or division goes out, it is 3 days before they have communications. With whom?

General **Wagner**. If they go out there today and they want to set up an entire area communications system; that means the capability of picking up a telephone and talking to someone, it can take 2 to 3 days.

That does not mean they don't have communications, but they have limited communications. They don't have that when they are running about the battlefield today.

That is the problem we have. We are looking for something you can set up and tear down in a matter of hours.

Senator **Glenn**. I think this is very important, Mr. Chairman, if I can pursue this for 1 second here.

I don't understand what this means. Let us say the flag went up. We go into combat right now in the European area.

Are we capable of communicating enough to prosecute a battle if that is the case?

General **Wagner**. Yes, sir; we are capable of communicating enough to prosecute that battle, but we are going to have delays in transmitting information as they wait in line to get their message through. Particularly, until they get the area communications set up, there are going to be delays because they are going to have to use the standard radios we have out there to communicate.

They use leased phone lines in some cases to speak from unit to unit. We can do it today, but we can't do it efficiently and do it quickly. That is why we need this system.

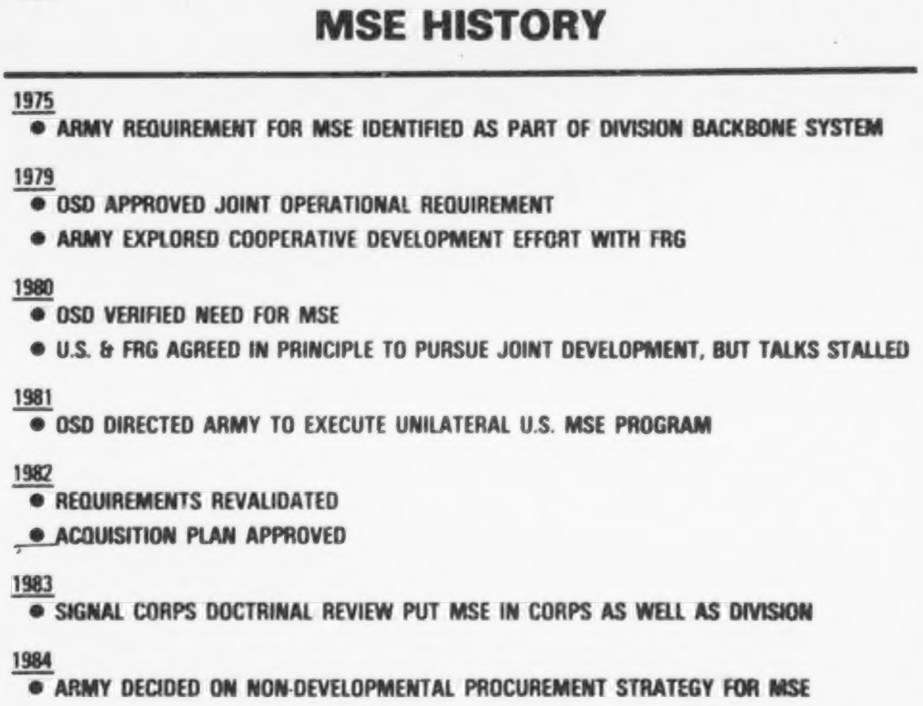
More important, it takes a tremendous number of people to operate today's system. We are trying to pull 5,000 people out of Europe by improving our communications networking. It is very manpower intensive today.

Senator **Bingaman**. I understand this is mobile subscriber equipment.

Is that what you are talking about here?

General **Wagner**. Yes, sir.

Senator **Bingaman**. I have a sheet here that is supposed to be listing major systems' schedules. You haven't come to any of the milestones on that.



MSE HISTORY

1975
- ARMY REQUIREMENT FOR MSE IDENTIFIED AS PART OF DIVISION BACKBONE SYSTEM

1979
- OSD APPROVED JOINT OPERATIONAL REQUIREMENT
- ARMY EXPLORED COOPERATIVE DEVELOPMENT EFFORT WITH FRG

1980
- OSD VERIFIED NEED FOR MSE
- U.S. & FRG AGREED IN PRINCIPLE TO PURSUE JOINT DEVELOPMENT, BUT TALKS STALLED

1981
- OSD DIRECTED ARMY TO EXECUTE UNILATERAL U.S. MSE PROGRAM

1982
- REQUIREMENTS REVALIDATED
- ACQUISITION PLAN APPROVED

1983
- SIGNAL CORPS DOCTRINAL REVIEW PUT MSE IN CORPS AS WELL AS DIVISION

1984
- ARMY DECIDED ON NON-DEVELOPMENTAL PROCUREMENT STRATEGY FOR MSE

General WAGNER. I will show you that in a second. A lot of people think this is new. It is not new. We have had this in our requirement since 1975. It was always part of TRI-TAC which is the Triservice Tactical Communication Program, but it was very expensive to put in. We had a couple of false starts on it.

For example, we tried to start one with Germany. That didn't work out. We tried to execute our own and it became very expensive. We dropped out of that. That is the reason we have taken this off-the-shelf approach I am showing you today.

Chairman GOLDWATER. General, this has been a problem for the Army for a long, long time.

Are you making any headway?

General WAGNER. We are, sir. We are making significant headway. One way we are doing it is simplifying it through this particular system. We are trying to procure complete division and corps sets so that we don't put a little bit here and a little bit there and can't do the job.

This program is one reason there is nearly a $900 million increase in command and control this year because it doesn't do us any good to take a large part of our resources and put it on fighting equipment if I can't control it on the battlefield.

MSE REQUIREMENTS

VENDOR ASKED TO SUPPLY TOTAL SYSTEM TO SATISFY OPERATIONAL REQUIREMENTS

- FIVE SYSTEM FUNCTIONAL AREAS
  - SUBSCRIBER TERMINALS
  - MOBILE SUBSCRIBER ACCESS
  - WIRE SUBSCRIBER ACCESS
  - AREA COVERAGE
  - SYSTEM CONTROL
- VENDOR MUST DEMONSTRATE OFFERED SYSTEM IN PRODUCTION CONFIGURATION
- PROVIDE EXISTING TEST DATA TO SUBSTANTIATE SPECIFICATIONS AND OPERATION
- PROPOSE ALL LIFE CYCLE SUPPORT—TRAINING, FIELDING, MAINTENANCE, LOGISTICS SUPPORT, WARRANTY
- MUST BE SECURE
- PROPOSED SYSTEM MUST COVER 150KM X 250KM CORPS AREA
- CORPS SLICE SERVES
  - 1900 MOBILE SUBSCRIBERS
  - 10,000 STATIC SUBSCRIBERS

Chairman GOLDWATER. Your problem has been in getting larger area communications. I can't for the life of me understand why it happens. In every field of communications we can talk to every area we want except in the military. Then we run into problems.

I have been in communications all my life and it is getting better and better and better except in the military where it is getting worse and worse and worse.

General WAGNER. I can't disagree with you, sir. I can tell you that the primary reason probably was that we didn't put the emphasis on it and we didn't put the dollars on it.

We were willing to go with what we had and wait on something that was going to give us everything, but never got here. That is the reason in the last year and a half we put a major emphasis on saying we are going to take what is available, we are going to field it out there quickly and take our resources out of the other things, if necessary, to make sure we can communicate.

You are right, we didn't emphasize it enough.

Chairman GOLDWATER. You still don't have adequate or dependable communications systems to take care of a division?

General WAGNER. That is right, sir.

Chairman GOLDWATER. There is no excuse for that. I tell you, you had better come up with something.

General WAGNER. I believe with what is in the program this year and over the next 5 years we are going to lick that problem.

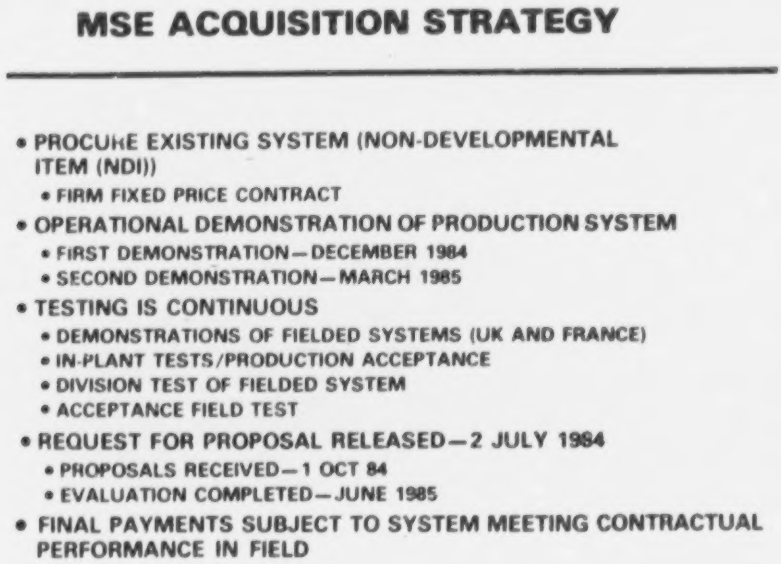
Chairman GOLDWATER. It shouldn't take 5 years.

General WAGNER. It has taken 5 years, sir, because of the dollars we have to put on it. I can tell you that the program until last year was 15 years.

We will have this particular set of equipment fielded, to include reserve components, by 1993.

Chairman GOLDWATER. I can take you down to Radio Shack and for less than $100 I can buy you better equipment than you have in the division.

General WAGNER. That is partially correct, sir. In fact, if you go out to our divisions today, you will find Radio Shack computers, and so forth, they are using to solve part of the problem.



MSE ACQUISITION STRATEGY

- PROCURE EXISTING SYSTEM (NON-DEVELOPMENTAL ITEM (NDI))
  - FIRM FIXED PRICE CONTRACT
- OPERATIONAL DEMONSTRATION OF PRODUCTION SYSTEM
  - FIRST DEMONSTRATION—DECEMBER 1984
  - SECOND DEMONSTRATION—MARCH 1985
- TESTING IS CONTINUOUS
  - DEMONSTRATIONS OF FIELDED SYSTEMS (UK AND FRANCE)
  - IN-PLANT TESTS/PRODUCTION ACCEPTANCE
  - DIVISION TEST OF FIELDED SYSTEM
  - ACCEPTANCE FIELD TEST
- REQUEST FOR PROPOSAL RELEASED—2 JULY 1984
  - PROPOSALS RECEIVED—1 OCT 84
  - EVALUATION COMPLETED—JUNE 1985
- FINAL PAYMENTS SUBJECT TO SYSTEM MEETING CONTRACTUAL PERFORMANCE IN FIELD

Basically our acquisition strategy is to buy off-the-shelf equipment with a firm fixed-price contract. A lot of people are criticizing us on this particular program because they said we are not developing it in the normal sequence and testing it over a long period of time.

If we do that, we are going to have a 15-year system. What we are looking at is a demonstration of a system that is essentially fielded today, at least the components of it. The two we are looking at are being put together by a consortium in U.S. industry, French in the case of RITA and British in the case of the PTARMIGAN system.

Rockwell and ITT are together with the British and GTE is together with the French. They are going to demonstrate this on the ground as a fully laid out system.

MSE PROCUREMENT

- LONG STANDING REQUIREMENT FOR FULL TRITAC/MSE
- AVOID LENGTHY, COSTLY R&D PROCESS
- PUT BURDEN ON CONTRACTORS TO DEMONSTRATE ACTUAL HARDWARE, NOT PAPER SYSTEM
- REINFORCE CONTRACTOR PERFORMANCE RESPONSIBILITY THRU WARRANTY, FIELD ACCEPTANCE, AND FINAL PAYMENTS
- FIELD COHERENT SYSTEM QUICKLY ACROSS AC, NG, USAR

ATTRACTED COMPETENT, PROVEN VENDOR TEAMS
(ITT/ROCKWELL/PLESSEY)
(GTE/THOMSON)

Then we are going to continue to test it as we put it together in the plant and put a complete division set of and corps set of it out in the United States to make sure it complies with the specifications we have developed.

One thing that is key to this, we are not going to pay them normal progress payments. Until we see that it meets the requirements, they don't get their full progress payments, they don't get any profits.

This puts a tremendous incentive on these consortiums to provide what we want.

Mr. Goldwater made this very clear, this has been a requirement for 10 to 15 years. We have not solved it yet. We believe we can cut down on the lengthy R&D process by what we are doing today.

We want to field it completely across the force, not just dump the old equipment on reserve components so that they can't communicate for another 20 years.

MSE DEPLOYMENT PLAN

- FIELD TOTAL FORCE (AC/RC) BY CORPS SETS
  - 5 CORPS
  - 25 DIVISIONS
- FY85/$63.3M, FY86—$335.3M, EQUIPS (DELIVERY FY88)
  - TRAINING BASE
  - 2 AC DIVISION BATTALIONS } III CORPS, FT. HOOD
  - 1 CORPS AREA BATTALION }
- FY87—$786.3M (DELIVERY FY89)
  - COMPLETES III CORPS (AC & RC), BEGINS V CORPS ACQUISITION
    - — 4 CORPS AREA BNS
    - — 4 DIVISIONAL BNS

This is our deployment plan. Part of it is the same as our unit fielding. We are going to put it in all our corps and divisions and put it in by corps sets.

The first one is going to be at Fort Hood, TX, so that we can be absolutely sure the training program logistics system and doctrinal concepts work over an extended period of time. Then we will buy a corps set a year and deploy to Europe following that.

Senator GLENN. Is this going to be compatible with other services, too, Army, Air Force, Marines?

General WAGNER. Yes, sir, the requirement is that they must show it is interoperable with the other services and interoperable with our allies because we don't fight anything but coalition warfare today.

The Air Force and Marines are watching this very carefully because they have a similar problem in the communications area, particularly in the Marine Corps if they have to go in and expand over a large area.

I think they are very interested in this. But it will be interoperable with the equipment they have today.

Senator LEVIN. Are they purchasing similar systems?

General WAGNER. No; not at this time. They are buying TRI-TAC equipment.

Senator LEVIN. Are they planning on buying equipment in the next 5 years?

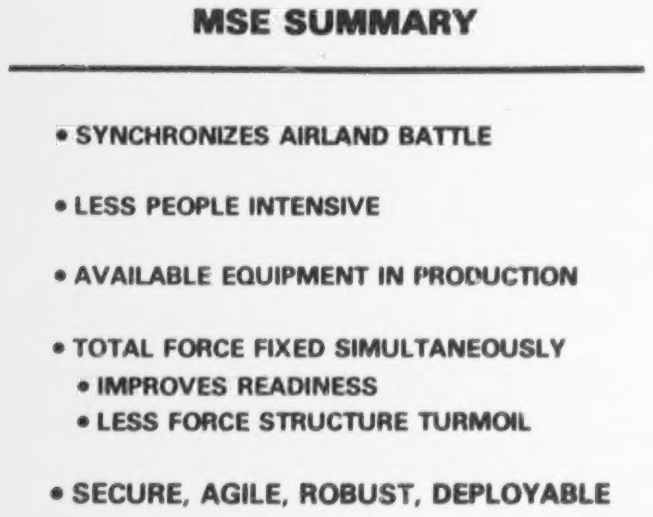
General WAGNER. As far as I know, they have not made a decision at this time.

Senator LEVIN. I think we ought to inquire to see if they are planning to buy equipment. If not, could they buy this equipment?

General WAGNER. They are monitoring our program. We invite them to all the meetings, we invite them to demonstrations.

Senator LEVIN. Why shouldn't it be a joint type?

General WAGNER. I think we should have the same type of equipment. I have no objection to that.



MSE SUMMARY

- SYNCHRONIZES AIRLAND BATTLE
- LESS PEOPLE INTENSIVE
- AVAILABLE EQUIPMENT IN PRODUCTION
- TOTAL FORCE FIXED SIMULTANEOUSLY
  - IMPROVES READINESS
  - LESS FORCE STRUCTURE TURMOIL
- SECURE, AGILE, ROBUST, DEPLOYABLE

This is a summary of the program. It gives the capability to economize with savings in our Active Forces of about 1,300 people. That is good because we will have a greater capability than we have today.

Senator GLENN. Mr. Chairman, I might ask the question of the committee.

Is the committee studying this? Do we have any subgroups that are studying this communications thing?

It is nice to look at all the tanks and airplanes and everything else, but it doesn't mean anything unless you have battlefield command of these things so that you coordinate them.

Are we running any special study on this? This is so important. I agree with every word you said a little while ago.

Chairman GOLDWATER. John, I couldn't agree with you more. I was just talking with staff here. I don't know of any study we are making other than we know that the Navy and the Air Force have an awful hard time talking to each other. The Army and the Air Force have less trouble, but it is still a problem.

The Marines have their problems.

Do you have any answer to that?

Mr. CARL SMITH. The chairman has scheduled a joint communications hearing on March 14, to look at the question of interoperability.

That doesn't go to the issue of modernization that General Wagner is touching on now. The question is how do we interoperate the forces and look at the equipment that we are bringing on, whether or not the mechanism exists overseas.

Senator GLENN. It is not just interoperability. It is basic communications to begin with and whether it is secure.

When we talk about a 15-year plan or something, that to me is a little preposterous.

General WAGNER. That was the plan for years because of the cost of it and the shortages of dollars. That is the reason we changed that plan within the last year and a half. We said we cannot afford to wait.

We are going to go out and see if we can buy it off the shelf to complete the job faster. There are a lot of studies going on.

When the people from OSD come over, they will show how they are trying to pull that together. There is no single area in the Army today that has had more top emphasis and review in the last year and a half than the communications, command and control arena that I have been involved in.

Chairman GOLDWATER. When you stop to think about this, it really gets sort of stupid. We can put a man on the moon and with a 5-watt transmitter transmit television signals back to earth that are perfect, with practically no trouble, but we have a hard time putting equipment together that can talk 20 miles from division headquarters to the front lines that is dependable.

It works today, it doesn't work tomorrow. We are having an argument with the Germans on IFF. I don't know why we have an argument with the Germans on IFF. They invented the equipment.

Concerning this hearing on March 14 I want you to know that I am sick and tired of hearing every year in hearing after hearing from the Air Force, Navy, Army, and Marines that they are having problems.

Maybe they should go back to flag signals.

Senator BINGAMAN. Am I right that this IFF Program is still on a 15-year basis?

General WAGNER. No, sir. IFF, the identification friend or foe, is a piece of communication, but there are two parts to that.

First of all, it is the air to ground and ground to air. In other words, you have to be able to identify the enemy air and friendly air for air defense weapons. That is one of the major problems we have. Also, there is an IFF problem of just ground to ground being able to identify each other. Then there is a problem, can the air identify the enemy on the ground? That is a major effort that we are moving on now.

The part I believe Mr. Goldwater is talking about is that basic first piece, just with your aviation elements up there being able to make sure whether they are friend or foe.

Senator BINGAMAN. Which is the MK-15?

General WAGNER. That is the IFF that is ground to air and then air to ground. When I say air to ground, it does not help him identify a friendly tank on the ground.

Senator BINGAMAN. How long a development will that require?

General WAGNER. I will have to provide that for the record. That is not a short term. It is probably 4 to 5 years before we begin to get that.

Today we use the MK-12 which, as Mr. Goldwater will point out, is not the most reliable.

[The information follows:]

IDENTIFICATION FRIEND OR FOE

We expect to complete development of the MARK XV and begin low rate initial production in 1982.

Senator **Levin**. Could I take 1 minute a bit out of turn because I am afraid I have to leave.

Senator Leahy had a number of questions he wanted to ask about adequate funding for Guard and Reserve.

Could I get an agreement to ask these for the record for Senator Leahy?

I have a number of questions also I would like to ask both Secretary Sculley and the general for the record.

Just one question on the chart on this multiyear funding. You show a number of areas including one I have been interested in, the M1 tank, multiyear savings. I think the figures on the M1 tank show we could buy 840 of them for the price of 720 if I remember the figures correctly.

General **Wagner**. That is about right.

Senator **Levin**. Is the Army going to be fighting for all the multiyears you have on this chart?

Is that going to be a top priority?

General **Wagner**. Yes, sir; we can't buy the number we want to buy if we don't do that.

Chairman **Goldwater**. You will be all right unless somebody has an amendment to strike out all the tanks.

Senator **Levin**. I did not hear that.

Senator **Nunn**. I did not know you were working on that, Mr. Chairman.

AQUILA REMOTELY PILOTED VEHICLE [RPV]

General **Wagner**. Another very important system for the Army and one that is under a lot of scrutiny right now is our RPV, remotely piloted vehicle, or AQUILA Program.

I have three charts that summarize our investigation of other off-the-shelf RPV systems. This chart shows the AQUILA requirements that could be satisfied with a direct off-the-shelf buy, and which could be satisfied by an enhanced off-the-shelf system. This shows a cost comparison between generic off-the-shelf, enhanced generic "Design to Unit Production Cost," and AQUILA "Design to Unit Production Cost." Here you can see that the AQUILA cost to complete is less than the cost for an enhanced generic system, and that AQUILA is available quicker.

COMPARISON OF CAPABILITIES

CAPABILITY	GENERIC	ENHANCED GENERIC	AQUILA
RECON AND SURVEILLANCE	X	X	X
PRECISE TARGET LOCATION	SOMETIMES	X	X
LASER DESIGNATION	NONE	X	X
SURVIVABILITY (AIR VEHICLE)	LOW	X	X
ANTI-JAM DATA LINK	NONE	X	X
TACTICAL MOBILITY	LIMITED	X	X
ENDURANCE	X	X	X
TRAINABILITY	X	X	X
ILS SUPPORT	LIMITED	X	X
POINT AIR VEHICLE RECOVERY	NONE	NONE	X
RELIABILITY/DURABILITY	UNKNOWN	X	X
SURVIVABILITY (GROUND SYSTEMS)	POOR	X	X

12/84 66-499

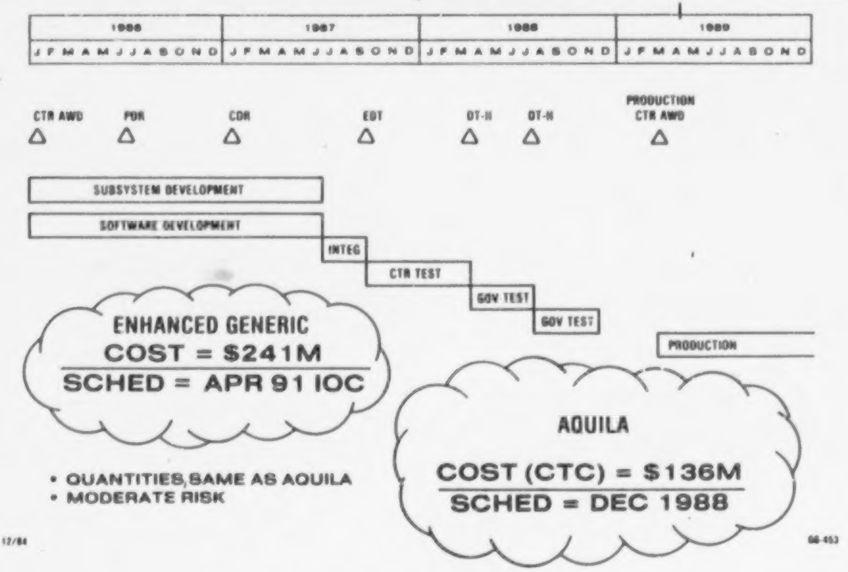
RPV COST COMPARISON

(CONSTANT FY 85 DOLLARS IN THOUSANDS)

	GENERIC OFF-SHELF	ENHANCED GENERIC DTUPC	AQUILA DTUPC
• AIR VEHICLE			
AIRFRAME	86	127	96
ELEC/PROP	15	19	42
FLIGHT CONTROL	48	81	91
DATA LINK (ADT)	30	176	176
TOTAL	179	403	405
• TV	45	115	218
• TV WITH LASER	N/A	181	284
• FLIR	115	195	275
• FLIR WITH LASER	N/A	265	345
• LAUNCHER	373	378	417
• RECOVERY	6 (CHUTE)	6 (CHUTE)	429 (NET)
• GCS	960	924	924
• DATA LINK (GDT)	50	622	622

12/84 66-452

ENHANCED GENERIC RPV PROGRAM DEVELOPMENT SCHEDULE



ENHANCED GENERIC
COST = $241M
SCHED = APR 91 IOC

AQUILA
COST (CTC) = $136M
SCHED = DEC 1988

- QUANTITIES SAME AS AQUILA
- MODERATE RISK

Basically we had a lot of problems with it. I will tell you that up front.

AQUILA REMOTELY PILOTED VEHICLE (RPV)

- PROGRAM ON TRACK !!
- FULL SCALE DEVELOPMENT FLIGHT TESTS (SUCCESSFUL LAUNCH & RECOVERY) HAVE YIELDED 89.3% SUCCESS RATE
- EARLY CAPABILITY AT FT HOOD HAS YIELDED 100% SUCCESS RATE
- SUCCESSFUL DEMONSTRATION OF LASER DESIGNATION FOR COPPERHEAD - 17 DEC 84
- PROTOTYPE QUAL TESTING: JAN-APR 85
- DEVELOPMENT TEST II: APR-AUG 85
- OPERATIONAL TEST II: SEP-DEC 85
- ASARC III: MAR 86
- TWO ADDITIONAL EARLY OPERATIONAL CAPABILITY SYSTEMS WILL IOC IN 1986
- PRODUCTION SYSTEM WILL IOC DEC 1988

Those problems probably started because we asked it initially to do too much in a small package. However, most of those problems have been solved now and we feel that it is going to give the battlefield commander the capability he needs to find the enemy and be able to attack him.

We have been successful in testing to date. For example, after a slow start we have had over 90 percent total success with test flights in full scale development. They have a prototype system at Fort Hood, TX, in the hands of the troops that has had 100 percent success in the missions it has flown.

I personally think that the key thing to do right now is to quit testing it in the normal environment and get the systems out there in the hands of the troops where you have a true operational test.

That is what we plan to do. We are going to continue the full development of the system to make sure it is right before we field it. But next year, in 1986, we are going to take an early version of it and put a section of it in Europe and the other one either in CONUS or in Korea to make sure it is working in the hands of the troops.

It will not have the full capability. For example, it will have a commercial FLIR, but it will give us the same capability as the production system. We believe with that and then going through the development we now have on track, we will get a good system.

Senator **Thurmond**. Again, on that point, what are the capabilities and cost of our RPV that General Gorman's command is using?

General **Wagner**. As far as the cost of the bird itself, it is no cheaper. I would have to lay out in great detail all of the capabilities, sir, because it does not have a laser designation capability, it doesn't have an accurate capability of telling exactly where it is.

It is not semiautomatic in operation, so it takes a highly trained individual. I think we are spending $13 million to give him that interim capability down there. He will tell you that is excellent in that area and particular environment because he doesn't have to worry about its being jammed, and so forth.

If he were in a mid- or high-intensity war, he would not be able to use that, it has no antijam modes. It is not as survivable because of the size of it. It can be shot down more easily. In the low spectrum of conflict it is good. In the higher spectrum, it would not be very survivable.

Senator **Bingaman**. What does that mean as far as the number of the total buy, 15?

General **Wagner**. There are actually 13 batteries of these that would be equivalent to division sets. These will be in corps and then as divisions go out into combat, they will give them sets of this equipment to use.

The total number of sets is 15. Some of it is in training buys. Some of it is spares and the rest is in the 13 sets.

Chairman **Goldwater**. Are we looking at $1¼ million for one of those?

RPV FINANCIAL SUMMARY

PROGRAM UNIT COST
(CONSTANT FY86 $)

DEV EST FY84	119.2
FY85	119.2
FY86	123.1

$(000,000)

COST GROWTH

FY85-86	3.3%
TOTAL	3.3%

	FY84 & PRIOR	FY85	FY86	FY87	TO COMPLETE	TOTAL
RDT&E	522.9	106.8	56.0	34.4	330.6	1050.7
WPN SYS PROC*	0	0	134.6	266.4	773.8	1174.8
QUANTITY BUY	0	0	0.6	4.0	10.8	15.4

*DOES NOT INCLUDE SPARES AND GFE $(000,000) ESC

General WAGNER. The bird itself is less than $100,000. It is the suite of sensors you put on it that run it up to $800,000 plus. It has night capability, laser designation capability, antijam capability, data link capability, and daylight capability.

Then you have to add the launchers to it so that you can use it on the battlefield and recover it on the battlefield.

WHY AQUILA?

- CONGRESS HAS URGED ARMY FOR MANY YEARS TO PURSUE AN EFFECTIVE SURVIVABLE UNMANNED VEHICLE OR RPV
- TO DEVELOP AN EFFECTIVE AND SURVIVABLE RPV HAS TAKEN SEVERAL YEARS, HOWEVER WE HAVE DONE SO-THE AQUILA AND IT IS READY FOR PRODUCTION NOW!
- WITHOUT AQUILA
  - THE ARMY WOULD STILL HAVE AN EVER INCREASING NEED FOR A RPV
  - THERE IS NO WAY TO GET AN EFFECTIVE AND SURVIVABLE SYSTEM WITHOUT ADDITIONAL DEVELOPMENT DOLLARS AND TIME-(BOTH OF WHICH THE ARMY DOES NOT HAVE)
  - THE ARMY'S CAPABILITY TO DEFEND ITSELF AND WIN WOULD BE SIGNIFICANTLY REDUCED
  - MILLIONS OF DEVELOPMENT DOLLARS WILL HAVE GONE DOWN THE TUBE
  - THE ARMY WOULD HAVE TO COME BACK TO THE CONGESS AND ASK FOR DOLLARS TO DEVELOP THE SAME THING WITH A HIGH PROBABILITY OF ENCOUNTERING THE SAME DEVELOPMENTAL RISKS

Why do we think Aquila is the way to go?

First of all, we agree with you we have an increasing need for it, but it has to be survivable and effective. Survivability is going to be very important on the intensive battlefield of the future.

The Israelis used them effectively with a very simple data link in the Lebanon incursion. Today they are looking for an antijam link.

We have looked in great detail at the other off-the-shelf programs that are available total. I can provide that for the record if you would like.

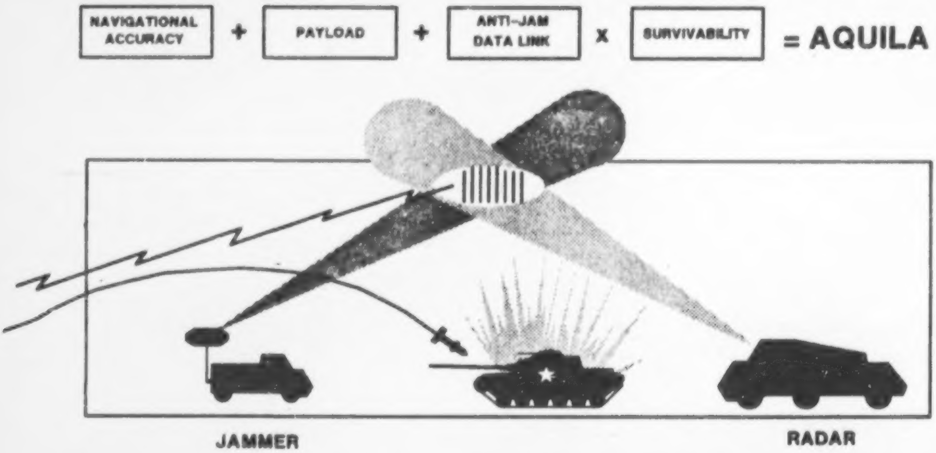
If you buy one off the shelf today, to give it an approximately equal capability with Aquila, it will take 2 years longer and cost more money.

Why do we want one that is survivable?

First of all, if it does not have a small radar cross section with the sophisticated capability of their air defense, the enemy today will take it out. It has to be able to go in and make basic maneuvers. The data link must be antijam if we are going to get information from it.

Those are the things that are driving the cost up.

A SURVIVABLE FIRE SUPPORT SYSTEM



This chart gives you an idea of what it has to contend with. It is going to be under the radars of the enemy, under the jammers of the enemy, but it has to see him and then pass the information on.

We have to know exactly where it is because we are going to use it to help us deliver fire on the enemy. For example, with this laser designator it can designate for a Copperhead round fired out of a 155mm howitzer.

I will show you how successful it is against the tank.

Finally, we believe that the only RPV that can do the job effectively is the Aquila.

This film clip is one that we fired in December down at Fort Huachuca just to make sure we could combine the Aquila and Copperhead.

[Film presentation.]

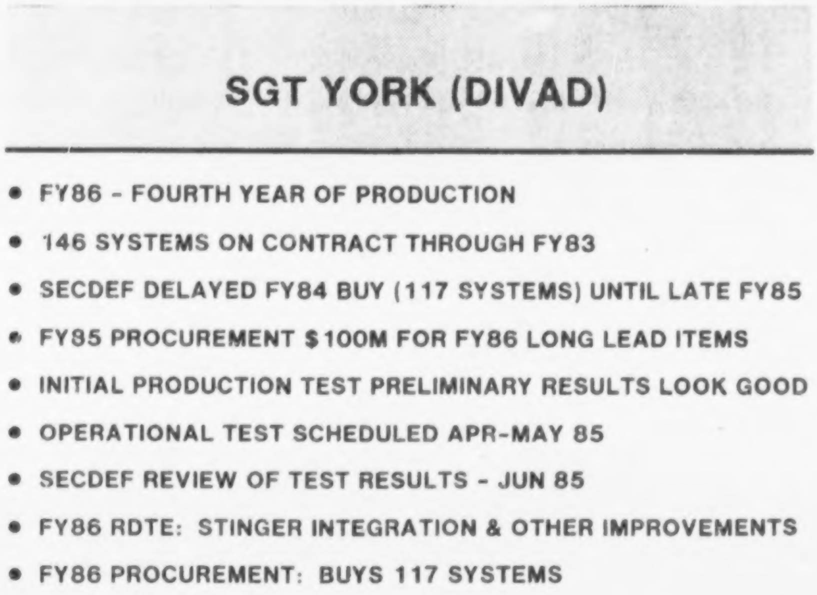
General WAGNER. What they are doing here is adjusting the code on the Copperhead round before they put it in the howitzer so it can communicate with the laser designator in the Aquila. This is a Howitzer firing that 155 millimeter. This view is actually through the TV, what the RPV saw as he is putting his laser designator on the tank down there.

There is the round coming in. It hit the bottom of the tank. Now, this is important because to be mobile on the battlefield we have to be able to land it in a small area. This is smaller than the one General Gorman has. He has to have a runway to land his particular RPV.

With the Aquila you take off with a short launch rail and you can recover it in a net on the battlefield. You can control it in a small area and we feel it is going to give us the capability that we need.

SERGEANT YORK DIVAD GUN

The Sergeant York Divad Gun is a controversial item. You had a hearing on this, so I am going to give you some of the things that have happened since we had that particular hearing and where we stand on the Sergeant York now.



SGT YORK (DIVAD)

- FY86 - FOURTH YEAR OF PRODUCTION
- 146 SYSTEMS ON CONTRACT THROUGH FY83
- SECDEF DELAYED FY84 BUY (117 SYSTEMS) UNTIL LATE FY85
- FY85 PROCUREMENT $100M FOR FY86 LONG LEAD ITEMS
- INITIAL PRODUCTION TEST PRELIMINARY RESULTS LOOK GOOD
- OPERATIONAL TEST SCHEDULED APR-MAY 85
- SECDEF REVIEW OF TEST RESULTS - JUN 85
- FY86 RDTE: STINGER INTEGRATION & OTHER IMPROVEMENTS
- FY86 PROCUREMENT: BUYS 117 SYSTEMS

Up front I will say that we are putting all our efforts into the testing we are doing right now and will be doing from now until the end of May to make absolutely sure we have answered questions of the critics on this particular piece of equipment.

We feel confident in the Army it is going to pass that test. If we didn't feel confident, we wouldn't start the test in the first place.

If it doesn't pass, we are not going to put a bad piece of equipment in the hands of the troops. We feel from what we have found out about it and the fixes we have made, we are going to be able to solve its problem.

Chairman GOLDWATER. Why don't you give up on your radar?

If you had a manual sight on that, I think that is all you need.

General **Wagner**. The problem we run into, Mr. Goldwater, is a few years ago that would probably be true; in fact, for the interim system we have right now that is true.

But as the enemy gets a greater and greater foul weather and night capability to attack us, which he is putting in his attack aircraft today, we have to have the capability of countering him under all weather conditions on that battlefield.

The attack helicopters that he is getting ready to field now have essentially the same capabilities as our AH-64, probably a little degraded at night, but they do have a night capability.

If we can't engage at night and in all weather, he will have an advantage over us. That is why we think we need that radar. It does have an optical mode. It is possible that would be the first choice used by the crew in many cases.

Chairman **Goldwater**. Then why do you change to doppler?

We have a hard time making it work in the F-16.

General **Wagner**. We really haven't had the problems with the radar that we have had with the other systems. It has proven very reliable out there. It is particularly effective in identifying hovering helicopters in ground clutter where other types of basic radar have that problem with ground clutter. That is one of the main reasons we went to the doppler because of the capability of finding him in the ground clutter.

If I could get a free shot at him, there is a much simpler radar I could use if I could find him at altitude. If we have to operate in that environment, we feel that is the radar we need to do the job.

Chairman **Goldwater**. I tell the Army you had better get it working.

General **Wagner**. Yes, sir, we agree.

Senator **Glenn**. You are going to testing on it right now. Will those be available to us before we vote?

General **Wagner**. Yes, sir. I will tell you some of these results today.

We will keep you informed on a continuing basis, on any schedule you desire, exactly where we stand at that particular time.

In fact, you or your people are invited to come down to see the test. Everyone else is going to be there, the AAA, the IG, the GAO, they are all helping us, sir.

Senator **Thurmond**. General Wagner, one of the requirements was the capability to engage high performance aircraft.

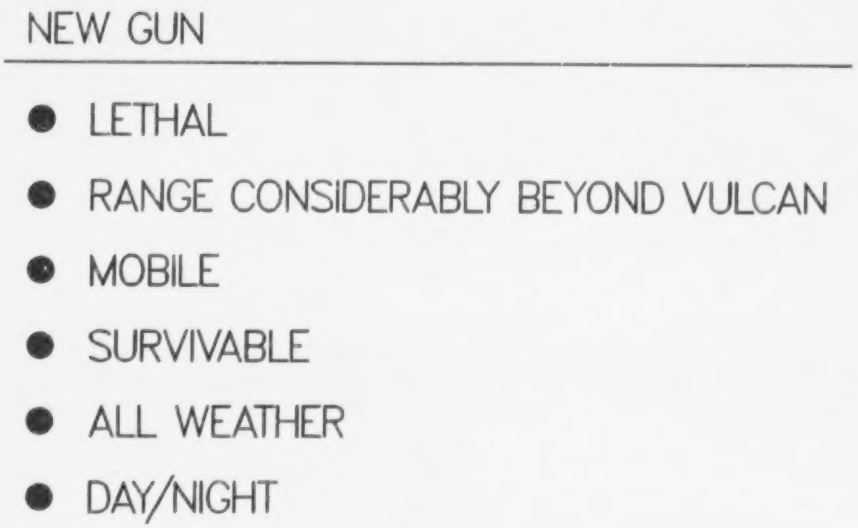
Is this still a requirement?

General **Wagner**. Yes, sir, it is a requirement. Our testing to date has shown that it does have the capability of engaging him. There is a slight problem in the time of engagement. We wrote a requirement that it be able to engage an enemy aircraft after acquired within 8 seconds.

To complicate that, we said starting with the guns facing the other way. Why that particular requirement was written that way, I am not exactly sure, but you generally know the direction you expect the enemy from, so you would be pointed in that direction. But that requirement is in there and we are trying to meet it. We are coming within 1.4 seconds of that capability today.

All the studies that we have run say that it is well within the capability of the Sergeant York to take him out or at least make him pull out of his approach pattern into our missile envelope or not be able to deliver his ordnance. You have accomplished your mission partially if this occurs.

You haven't destroyed him, but you have stopped him from destroying you.



NEW GUN

- LETHAL
- RANGE CONSIDERABLY BEYOND VULCAN
- MOBILE
- SURVIVABLE
- ALL WEATHER
- DAY/NIGHT

This is what we need in that gun. The gun we have out there today is the Vulcan. If you take a look at what the Vulcan shoots, it is the round [exhibiting round], with a range of about [deleted].

If we improve it we can probably get up to [deleted] meters. The probability of killing anything at that range is very small. It has no all-weather capability, cannot survive on the battlefield, because it has no protection. The Sergeant York happens to be on a tank chassis, so it is survivable on the battlefield.

DIVAD

This is the Divad. We feel it is going to be able to do that job. This is an example of what it shoots [exhibiting round]. That is a 40-millimeter round. When you talk 20 and 40, you think there is not that much difference, but this is the difference.

This is a proximity fuzed round, so if you come close to him, it is going to explode and knock him down.

It also has a point detonating round if you want to use it. It gives you a lot more fire power and range, over four times greater than the Vulcan round.

We have been able to engage targets out to about [deleted], although the scope and design of it is about [deleted] meters. [Deleted.]

ACQUISITION STRATEGY FEATURES

- HIGHER RISK DEVELOPMENT PROGRAM TO SAVE TIME AND MONEY
  - >> ACCELERATED STRATEGY, CONGRESSIONAL SUPPORT
  - >> CONCURRENCY IN ALL PROGRAM ASPECTS
  - >> INTEGRATED LOGISTICS SUPPORT DEVELOPMENT INTENTIONALLY DEFERRED
- RISK PROTECTION
  - >> COMPETITIVE SHOOT-OFF
  - >> FIXED PRICE INCENTIVE TYPE CONTRACT
  - >> TRADE OFF PERFORMANCE TO MEET COST/SCHEDULE
  - >> STRONG CONTRACTUAL PROTECTION—PERFORMANCE WARRANTY

Our acquisition strategy of the support of Congress was to use a high risk development. We had a serious deficiency on the battlefield. We had to solve that quickly which means we had concurrent testing and we had to fix those problems that were wrong. Part of this was covered because we had a good warranty which said the manufacturer would fix the problems on what he had built before, the ones he was building at the time and the ones in the future. So, we thought we were going to be OK.

SGT YORK TESTING

- ACQUISITION STRATEGY REQUIRED "LIMITED TESTING"
- DEVELOPMENT/OPERATIONAL TESTERS INVOLVED FROM START OF PROGRAM
- TEST PROGRAM EVOLVED IN RESPONSE TO
  - >> CONCERNS
  - >> PROBLEMS
- TEST PROGRAM IS WORKING

The testing has evolved as we have gone along. As we have run into problems, we have had a test. I would say the critical mistake the Army made up front in this accelerated program was not that it was an accelerated program, but the fact we didn't buy enough prototypes.

We had two prototypes and wore them out during the tests. We should have spent more money up front and done more testing. The test reported to you before was very limited, 2 weeks long, and didn't answer all the questions.

As a result, the Secretary of Defense said we are not going to execute the fiscal year 1984 option III purchase until we do some more testing. However, past testing has shown, as our operational testers predicted, it generally met all of those requirements that we expected.

For example, it was able to engage, according to specs, about 80 to 90 percent of the fixed-wing aircraft in a benign environment. It dropped down to 60 to 70 percent in an ECM environment.

In the case of helicopters it was 50 to 60 percent. We had a problem with one of the vehicles. We think we have solved some of that problem, which pulled the scores down.

Senator GLENN. What tests will be completed now before we have to vote on this?

General WAGNER. What will be completed is the initial production test that is going on right now.

Senator GLENN. Is that the one at SAC headquarters?

General WAGNER. No, that one will be finished by the end of June.

Senator GLENN. When is all operational testing going to be done so that we know we have a good vehicle?

General WAGNER. By the end of May that will be completed.

Senator GLENN. When do we go to the floor, in April?

Mr. CARL SMITH. Yes.

Dr. Sculley. A further problem will be the total reduction of the data from the testing. I think in all candor, to answer your question, Senator Glenn, most of the information from the testing at Fort Hunter Liggett and White Sands Missile Range in the April-May timeframe will not be available to you and the committee in totality.

General WAGNER. It will be July before we can have all that data. We can give you interim data, but if you want a final report, it will be July.

We have a requirement to give it to you 60 days after completion of the test and then we can do nothing in executing the contract for 30 more days without your permission.

If you authorize the dollars in this year's program with restrictive language, we can't spend it anyway unless we come back and report how the test is going.

Senator GLENN. You have in there $531 million, half a billion dollars.

General WAGNER. Yes, sir.

Senator GLENN. That is a big ticket item.

General WAGNER. Yes, sir; this is a total program of about $4.4 billion.

Senator GLENN. If we don't have the test results, what will we do then? Fence it or what?

Do we hold up on the money? What will we do on that?

General WAGNER. In fact, that is the situation we are in right now. The money is fenced. The 1985 dollars are fenced. Also, we are not going on contract until after we report to you on the 1984 dollars.

Half of those 1984 dollars are also fenced. We expect that. That is the reason we are running the test.

Senator GLENN. If you keep going all that time, how do the subcontractors stay going? Are they in other businesses that keep them alive waiting for this or is that running the cost of this thing up more per unit?

General WAGNER. It will raise it some per unit. We have a no-cost extension of the 1984 program, partially with your help and support over here, and also you allowed us to continue to keep them going at a very low production rate with no more expenditure than $200 million, to terminate the 1984 program if for some reason we fail in the testing and decide never to execute that option and never to execute any further contract.

That is how we are keeping them barely alive today, at a very low rate.

Senator GLENN. What if we fence all this 1986 money? Does that stop the subcontractors?

General WAGNER. No, sir; because we would expect that the fencing would be based on the results of the test and if the results of the test are as we expect them to be, we will be able to then execute the rest of the 1984 contract, the long lead 1985 which is fenced, and then go into the 1986 contract.

So, they can keep alive until September 30. After September 30 then we run out keeping those subcontractors alive.

That was a deliberate contract change we made in order to keep it moving at a slow rate, believing we had a good system and it was going to be able to pass these tests and prove that the critics were wrong.

Chairman GOLDWATER. They are going to do it or not. This is it. We are not going to buy it unless it works.

General WAGNER. We aren't either, sir. There is no question on that.

PRELIMINARY
INITIAL PRODUCTION TEST ASSESSMENT

(AS OF 14 FEB 85)

- **ARMAMENT SUBSYSTEM DOING VERY WELL**
- **GROUND FIRING HIT PROBABILITY GOOD**
- **DETECTION OF INGRESSING FIXED WING AND HELICOPTER TARGETS GOOD**
- **POWER AND ACTUATION RELIABILITY BELOW REQUIRED LEVEL**
- **MAINTENANCE ACTIONS NOT DIRECTLY AFFECTING MISSION MORE FREQUENT THEN EXPECTED**
- **FIXED WING REACTION TIME REMAINS ABOUT 1.4 SEC GREATER THAN THE 8 SEC REQUIREMENT**
- **HOVERING HELICOPTER REACTION TIME ABOUT 2 SEC GREATER THAN THE 8 SEC REQUIREMENT AT 4 KM**
  - **REACTION TIME REMAINS WITHIN THE 8 SEC REQUIREMENT AT ALL RANGES 3 KM OR LESS**

OPERATIONAL TEST ISSUES

ISSUE 1. HOW WELL DOES THE SGT YORK GUN PERFORM ITS MISSION NULLIFYING OR REDUCING THE EFFECTIVENESS OF ATTACK BY HOSTILE AIRCRAFT?

ISSUE 2. IS THE RELIABILITY OF THE SGT YORK GUN SUFFICIENT TO ASSURE A HIGH PROBABILITY OF COMPLETING AN OPERATIONAL MISSION WITHOUT AN OPERATIONAL MISSION FAILURE?

ISSUE 3. CAN THE SGT YORK GUN SURVIVE THE SPECTRUM OF BATTLEFIELD THREATS?

ISSUE 4. DOES THE SGT YORK GUN DAMAGE OR IMMOBILIZE HOSTILE GROUND TARGETS?

ISSUE 5. DOES THE OPERATIONAL AVAILABILITY OF THE SGT YORK GUN SUPPORT REQUIRED AIR DEFENSE OPERATIONS?

ISSUE 6. DOES THE PROPOSED MAINTENANCE CONCEPT FOR THE SGT YORK GUN BATTERY SUPPORT SUSTAINED AIR DEFENSE COMBAT OPERATIONS?

ISSUE 7. IS THE MAINTAINABILITY SUFFICIENT SO THAT PROPOSED MAINTENANCE MANNING WILL BE ABLE TO SUPPORT THE SYSTEM?

ISSUE 8. ARE THE PRESCRIBED LOAD LIST (PLL) AND AUTHORIZED STOCK LIST (ASL) REPAIR PART STOCKAGE LEVELS ADEQUATE TO SUPPORT THE SGT YORK GUN FOR FOE I?

ISSUE 9. CAN REPRESENTATIVE OPERATOR AND ORGANIZATIONAL MAINTENANCE PERSONNEL OPERATE AND MAINTAIN THE SGT YORK?

ISSUE 10. ARE THE HUMAN FACTORS AND SAFETY ASPECTS OF THE SGT YORK GUN ADEQUATE FOR OPERATION AND MAINTENANCE IN THE INTENDED OPERATIONAL ENVIRONMENT?

I can tell you right now in the initial production test we are doing well in some areas, in ground firing we are doing good, detection we are doing good, power and actuation reliability, not good. We are working hard on that right now.

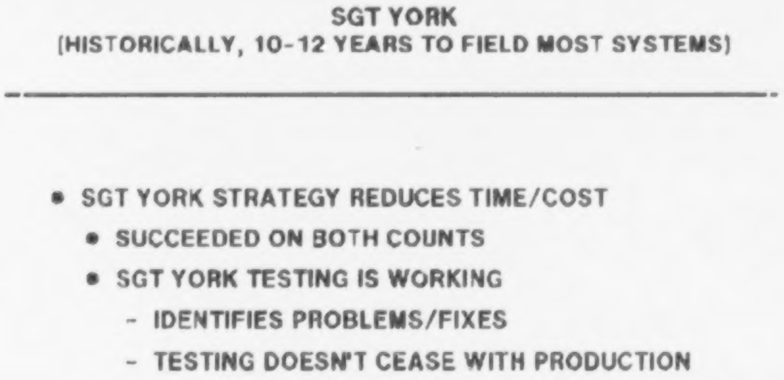
It is really minor things that we ought to be able to correct in the manufacture. Hydraulic lines that are leaking, some valves on hydraulic lines failing and the failure of the PPU or the prime power unit to operate properly.

We feel that the prime power unit problem can be licked. It is made by a very reliable manufacturer, Garrett. If we get that solved, that is our principal problem.

Mean miles between failures is on the tank chassis. You can't blame that on the gun. We are up to over 1,000 miles on that, which is good.

Fire control, we have a goal of 95. We are already up to 80. Really the problem we have today is with power and actuation and that is the one we are concentration all our efforts on.

In this test we are looking at everything in the world, but the bottom line is we want to know can it do its job in reducing the effectiveness of the attacking force?



SGT YORK
(HISTORICALLY, 10-12 YEARS TO FIELD MOST SYSTEMS)

- SGT YORK STRATEGY REDUCES TIME/COST
  - SUCCEEDED ON BOTH COUNTS
  - SGT YORK TESTING IS WORKING
    - IDENTIFIES PROBLEMS/FIXES
    - TESTING DOESN'T CEASE WITH PRODUCTION

Chairman Goldwater. General, the botton line is to make the system work.

General Wagner. That is what the test will do.

Chairman Goldwater. Make it work or you are not going to get that gun.

General Wagner. I agree, sir.

Bottom line, we have shorted it up 5 years, it saves about a billion. If it doesn't work, we can't field it. We have to make it work.

ADVANCED ATTACK HELICOPTER (AH-64) - APACHE

- FY86 - FIFTH YEAR OF PRODUCTION
- 171 PROCURED THROUGH FY84 (144 IN NEGOTIATION FY85)
- FIRST PRODUCTION AIRCRAFT ACCEPTANCE JAN 84
- BEGAN DELIVERY OF AIRCRAFT TO FT RUCKER/FT EUSTIS JAN 85
- TWO INSTRUCTOR KEY PERSONNEL TRAINING CLASSES COMPLETED IN 1984
- FIRST ARTICLE TEST COMPLETED IN 1984
- FY86 RDT&E COMPLETES TEST PROGRAM SET DEVELOPMENT
- FY86 PROCUREMENT REQUESTS FUNDING FOR 144 AH-64s

AH-64

The advanced attack helicopter is next. It is a question I want to get to on that. Can we produce at delivery rates that we have in the current budget and the ones in the future?

One good thing, we have the cost down in this year on our contract. We have a good learning curve on that. We think we are on track as far as the cost of it. We have had some production startup problems.

APACHE FINANCIAL SUMMARY

PROGRAM UNIT COST
(CONSTANT FY86 $)

DEV EST FY72	10.43
FY85	15.33
FY86	13.90

$(000,000)

COST GROWTH

FY85-86	-9.3%
TOTAL	+33.3%

	FY84 & PRIOR	FY85	FY86	FY87	TO COMPLETE	TOTAL
RDT&E	1182.3	27.7	17.5	0	0	1227.5
WPN SYS PROC	2853.1	1418.8	1376.3	1318.4	806.7	7773.3
QUANTITY BUY	171	144	144	144	72	675

$(000,000)

Basically, this is what is in the appropriation right now. If you remember, last year we were authorized 144. However, we did have a reduction of $40 million. That $40 million has cost us six aircrafts. So, we are going to be able to buy with the 1985 budget 138 of the aircraft.

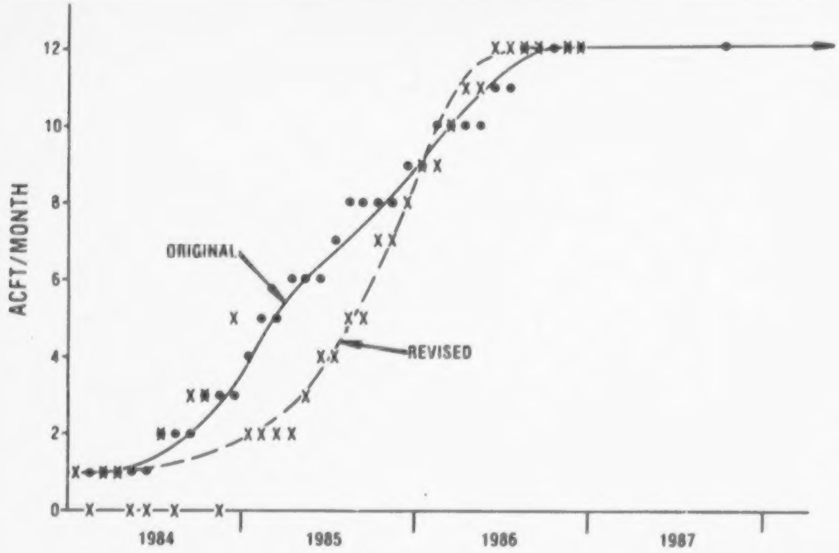
AH-64A APACHE
FY1985 BUDGET SUMMARY

($ IN MILLIONS)

	$	ACFT
FY1985 BUDGET REQUEST:	$1,290.2	144
FY1985 APPROPRIATION:	$1,246.8	144
FY1985 NEGOTIATED PROGRAM:	$1,246.8	138

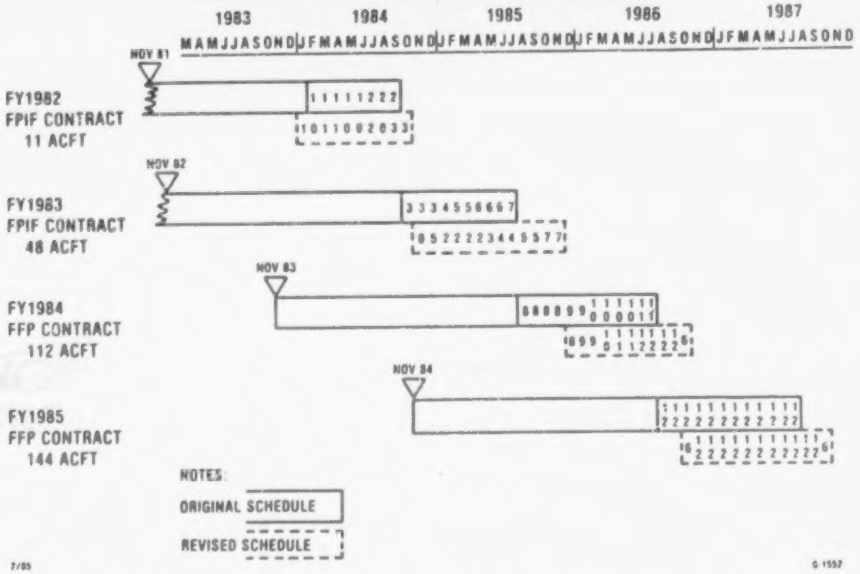
This is the program we are on right now to get up to the 12-month production rate so that we can produce 144 aircraft in a normal 12-month delivery.

PRODUCTION RAMP COMPARISON
AH-64A APACHE



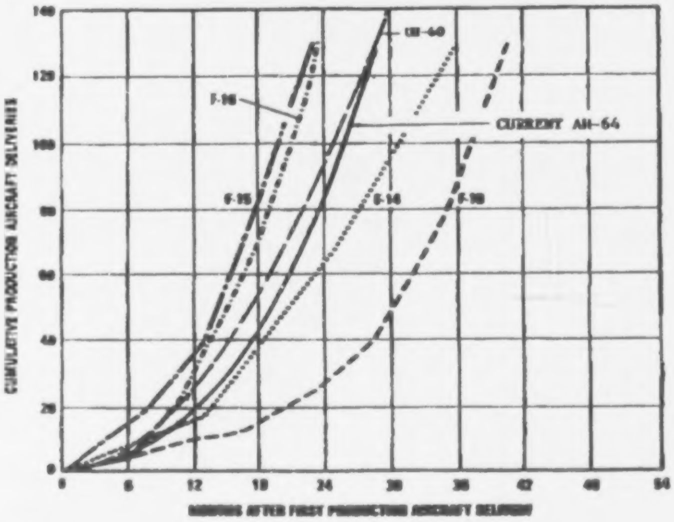
This was the original schedule. This is the revised schedule we are on right now. You will see they cross over here about the end of 1985. At that time we will be at 12 per month as we work up to this point, about nine per month and then we will work up to the 12 per month and we will be able to keep up that schedule until the end of the production. We feel we can achieve that.

AH-64A APACHE DELIVERY SCHEDULE COMPARISON



This shows you the delivery periods we are on right now. You will find that this one was reduced from a normal 12-month delivery period because of the fact that we had a steep ramp as we went into 1986. Then we get back to our 1984 buy on the normal 12.

COMPARATIVE PRODUCTION PROGRAM DELIVERIES



Finally, this chart shows you we can't think we are having any more startup problems than the services have had on a lot of other aircraft at this time in their production. We are about right here.

Now, we see on the chart where the UH-60 was. They had the same problems with the F-14 and F-18. They were on the same ramp that we are on. We are on a normal ramp buildup for an aircraft. That gives us some confidence that we can achieve that 12 a month.

As we look into R&D, there are just a couple programs we have some problems with. We put our program together to make sure that we have all of these guidance areas considered; that it is lethal; it is integrated; it is lighter. When we say light, we mean that equipment that goes into all divisions, we need to get it lighter to give us more deployability around the world.

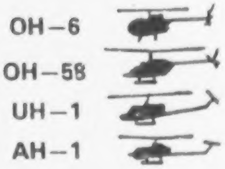
LHX

The light helicopter family is one of the major and largest program we are starting in the Army today. I will spend a few minutes on that.

Right now we are in advanced development for this aircraft. We are not in full-scale development on it. We are looking at the feasibility of meeting the requirement for this bird which will replace a large part of our light utility fleet.

LHX ➧ CONCEPT

- A Modern Replacement for the Current Light Helicopter Force



to be Replaced
after 30 Years
of Service by......

LHX

RESULTING IN

Improved Fightability
Higher Readiness
Standardization/Commonality
Lower Support Costs
Fewer Personnel

We have about 7,000 aircraft today in those categories and in those 7,000, there are 12 different models. We want to get down to three. We want one that gives us all of these capabilities and particularly at lower support cost and with fewer personnel.

This is what it has to do. I point out this is not replacing the AH-64. This is replacing light utility fleet, the UH-1, the older scout bird, not the AHIP, and a lot of the AH-1G's and S's.

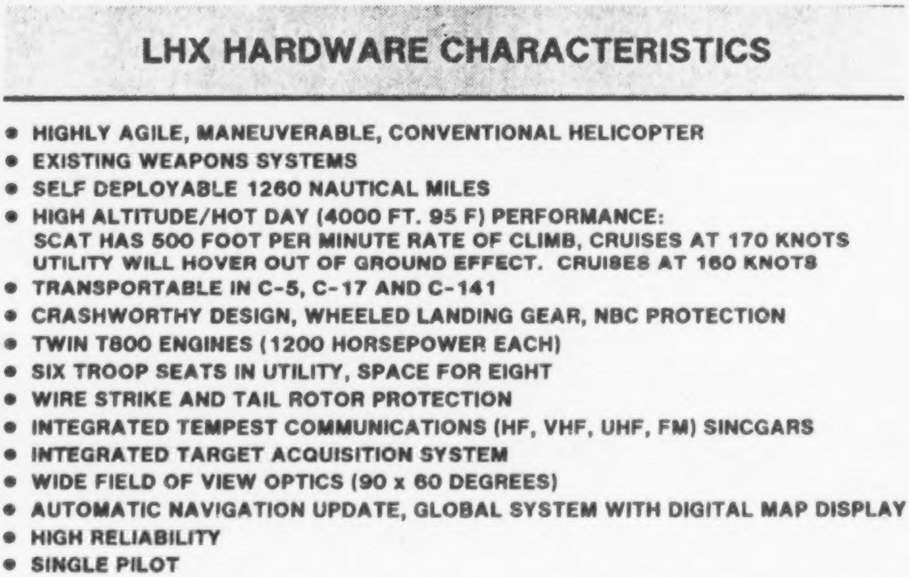
LHX ➧ MUST.........

- Survive on the Future Battlefield
- Operate Around the Clock
- Operate in Adverse Weather
- Operate in High/Hot Conditions With Full Mission Payload
- Maneuver with Unprecedented Agility
- Perform Extended Missions
- Self Deploy

LHX is Essential to Insure Army Aviation's Contribution as a Combined Arms Element Performing Combat, Combat Support and Combat Service Support Operations

The Army put some stakes in the ground last year. Those stakes in the ground are what you see here. We want it to weigh a certain weight because it is a light bird. The AH-64 is in the 16,000-pound category. We want to get the cost down, $3 to $4 million for the utility version and for the Scout version $5 to $6 million.

We are going to go single pilot and keep the cost down. The O&S costs will be reduced up to 40 percent.



LHX HARDWARE CHARACTERISTICS

- HIGHLY AGILE, MANEUVERABLE, CONVENTIONAL HELICOPTER
- EXISTING WEAPONS SYSTEMS
- SELF DEPLOYABLE 1260 NAUTICAL MILES
- HIGH ALTITUDE/HOT DAY (4000 FT. 95 F) PERFORMANCE:
  SCAT HAS 500 FOOT PER MINUTE RATE OF CLIMB, CRUISES AT 170 KNOTS
  UTILITY WILL HOVER OUT OF GROUND EFFECT. CRUISES AT 160 KNOTS
- TRANSPORTABLE IN C-5, C-17 AND C-141
- CRASHWORTHY DESIGN, WHEELED LANDING GEAR, NBC PROTECTION
- TWIN T800 ENGINES (1200 HORSEPOWER EACH)
- SIX TROOP SEATS IN UTILITY, SPACE FOR EIGHT
- WIRE STRIKE AND TAIL ROTOR PROTECTION
- INTEGRATED TEMPEST COMMUNICATIONS (HF, VHF, UHF, FM) SINCGARS
- INTEGRATED TARGET ACQUISITION SYSTEM
- WIDE FIELD OF VIEW OPTICS (90 x 60 DEGREES)
- AUTOMATIC NAVIGATION UPDATE, GLOBAL SYSTEM WITH DIGITAL MAP DISPLAY
- HIGH RELIABILITY
- SINGLE PILOT

These are the hardware characteristics of the LHX. I want to point out one thing to you. We are not asking for an advanced technology rotorcraft. We decided that when we look at the risk and at the cost, and at where this bird is going to be operating on the battlefield, that we had better stick with a conventional helicopter.

It does not mean it is conventional by today's standards because it is going to be composite, it is going to have fly-by-light flight controls. It will have much more reliable, redundant features than we have today.

When we go to a single pilot, it will have a suite of electronic equipment to help him fly.

LHX ▶ ACQUISITION STRATEGY

- Proof-of-Concept Precedes Final Requirements Document and Full Scale Development
- Engine Development Precedes Air Vehicle Development
- Competitive Development and Production of Engine and Air Vehicle (Two Sources)
- Simulators Available with System Fielding

Chairman GOLDWATER. You are talking about replacing the OH-6?

General WAGNER. Yes, sir.

Chairman GOLDWATER. The OH-58, UH-1, AH-1; that will take 30 years?

General WAGNER. No, sir, the average age of those is 30 years. We will start fielding this in about 1994. We hope to replace many of those by the year 2000. So, it will be over a several-year period that we will be replacing them.

Chairman GOLDWATER. You will have to have $40 billion.

General WAGNER. Yes, sir, if cost is in escalated dollars, that is about what it is.

If we try to keep those old birds flying, it is the O&S costs that are going to drive us bankrupt if we don't do something about replacing them.

We are probably going to replace only about 5,000 of those on the battlefield.

Senator THURMOND. I thought we would be through by now. I have to leave, I have two questions you can answer for the record.

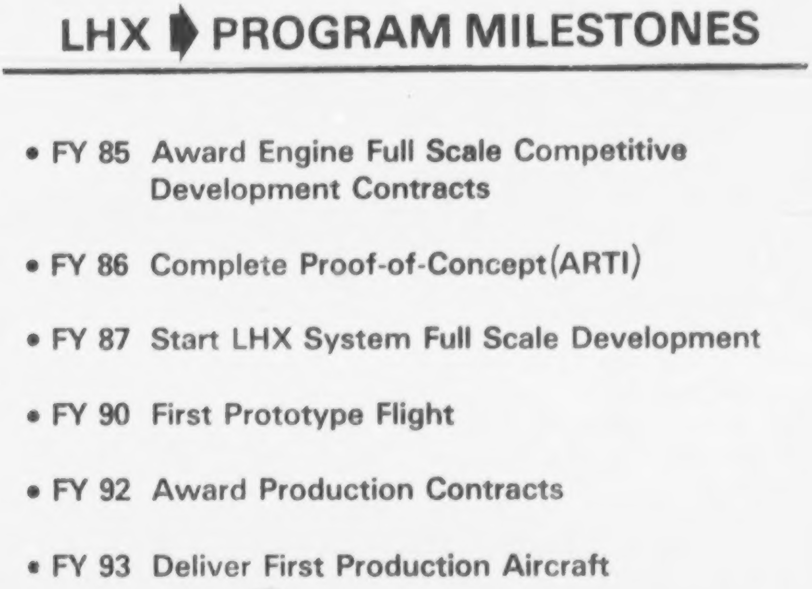
General WAGNER. Yes, sir.

One thing I want to point out is we want to be competitive in this development and production throughout. We want to bring teams of helicopter manufacturers together, two teams of two each. They will compete in R&D.

As we go to production, both of those, whichever is the winning team will be able to keep it in production. We think we can keep the cost down that way.

This is where we are right now. We are in advanced development. A lot of people are confused by that. They say we should have every descriptive item fully defined today.

It is going to have all those requirements I pointed out earlier put together in a letter agreement which is the normal requirement document at this point before we go to full-scale development which will be funded in next year's budget, not in the 1986 budget. We will have a complete ROC and CDEA to bring to you next year.



LHX ➧ PROGRAM MILESTONES

- FY 85 Award Engine Full Scale Competitive Development Contracts
- FY 86 Complete Proof-of-Concept(ARTI)
- FY 87 Start LHX System Full Scale Development
- FY 90 First Prototype Flight
- FY 92 Award Production Contracts
- FY 93 Deliver First Production Aircraft

Chairman GOLDWATER. Would this tilt rotor fit in here?

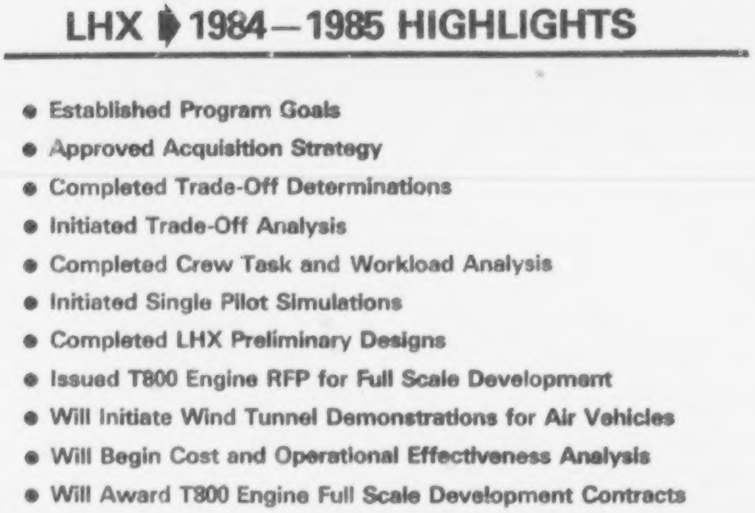
General WAGNER. It would not, sir, if we go to a conventional rotorcraft; that is an advanced rotorcraft.

We looked at that in great detail. We have had a lot of debate on it. The key thing that we ran up against was, first of all, it is higher risk. It is obviously going to be higher cost.

Unless we slow down considerably to let the rest of the industry catch up with the ones that are in that particular arena right now, we are not going to have much competition. So, we think we are going to have cost problems on it.

We looked at what do we need on the battlefield on this particular bird and how do we keep down the cost and not go to high risk. We believe sticking with the conventional rotorcraft is the way to go.

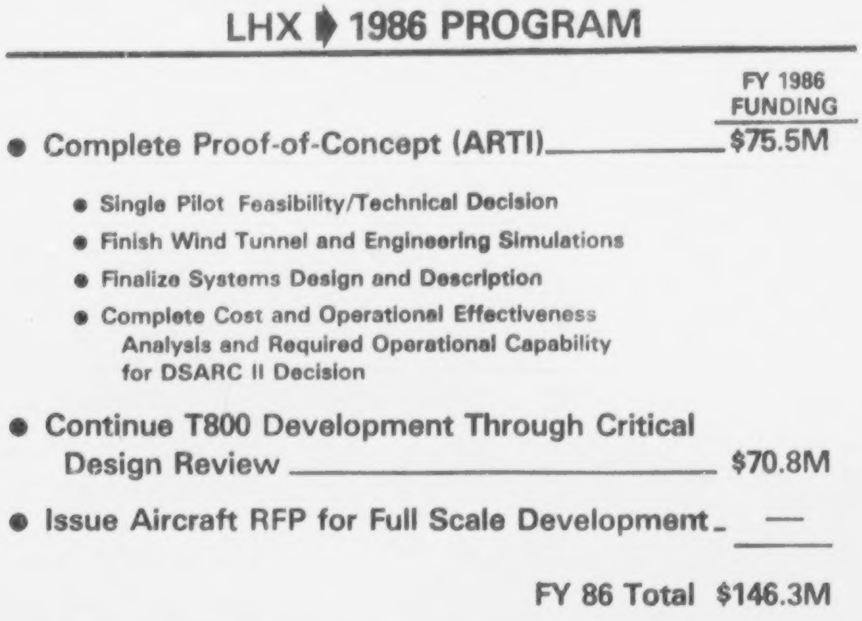
These are our milestones. We are on track. We aren't where we wanted to be when we came over for reprogramming a year and a half ago, which wasn't approved, but we are on track now.



LHX ▶ 1984–1985 HIGHLIGHTS

- Established Program Goals
- Approved Acquisition Strategy
- Completed Trade-Off Determinations
- Initiated Trade-Off Analysis
- Completed Crew Task and Workload Analysis
- Initiated Single Pilot Simulations
- Completed LHX Preliminary Designs
- Issued T800 Engine RFP for Full Scale Development
- Will Initiate Wind Tunnel Demonstrations for Air Vehicles
- Will Begin Cost and Operational Effectiveness Analysis
- Will Award T800 Engine Full Scale Development Contracts

This is what we did in 1984 and 1985. We have the RFP for the engine. We are going to go into our wind tunnel testing.



LHX ▶ 1986 PROGRAM

	FY 1986 FUNDING
● Complete Proof-of-Concept (ARTI)	$75.5M
● Continue T800 Development Through Critical Design Review	$70.8M
● Issue Aircraft RFP for Full Scale Development	—
FY 86 Total	$146.3M

Under Complete Proof-of-Concept (ARTI):

- Single Pilot Feasibility/Technical Decision
- Finish Wind Tunnel and Engineering Simulations
- Finalize Systems Design and Description
- Complete Cost and Operational Effectiveness Analysis and Required Operational Capability for DSARC II Decision

Our goals in 1986 are what you see here. We are going to complete the proof of concept which is our Advanced Rotorcraft Technology Program. It is looking at the feasibility of the single pilot. It includes the wind tunnel work.

We need to do this up front in order to logically go into the full-scale development of the aircraft.

In the past some of the problems we have had is that we went into full-scale development, and did not do technology work first. We are going to do this program right.

Finally, we are going to continue the engine and go out with the RFP on full-scale development. We think we are on track today. We can meet these goals, particularly since we decided to stick with the conventional helicopter.

We are going to be able to meet these cost goals which are very important.

LHX ▶ PROGRAM SUMMARY

PROGRESS TO DATE SHOWS:

- **Program Goals are Achievable**
- **Competition Key to Cost Goals**
- **Schedules are Realistic**
- **Technology Available Meets Requirement**
- **Program Retains U.S. Lead in Rotorcraft Technology**

Senator GLENN. If I could ask a question here.

General, the DOD Inspector General's report says the cost of the light helicopter, driven heavily by the cost of its mission equipment, could be much greater than $5 million per aircraft and clearly raises affordability as a major concern.

A related concern is the U.S. Senate statement about the affordability of the helicopter program. The Senate Armed Services Committee report on the fiscal year 1985 Authorization Act noted the cost growth experienced in previous Army helicopter programs and served notice that evidence of poor cost discipline and gold plating will invite terminating by Congress.

With the numbers we are talking about here, we are talking about what could be a $40 billion program overall.

General WAGNER. Yes, sir.

Senator GLENN. It is a tremendously expensive program. Last year Senator Goldwater asked what would be the impact of deferral of funding on LHX. General Merryman said it would delay modernization. This budget documentation indicates you have slipped the date of full-scale engineering development and initial operating capability.

Despite the slip in the program, you are requesting more money for the advanced rotor integration and LHX Program than you stated last year was your requirement.

That gives rise to the question: Is the LHX Program still on course? Why do you need more money for a program that has been stretched out?

Does this indicate the cost goal established for LHX might be too optimistic?

General WAGNER. We had planned on starting this program with a reprogramming. We didn't get that. So, as a result, we had to start up slower. That slipped us in the entire Advanced Rotorcraft Technology Program we are working on right now.

As a result, we had to use the dollars we had last year and put the dollars, $140-plus million this year to go with that to make sure we had done the up front technology work before we started the advanced development.

If we don't do that, then I can't come in and tell you yes, we can achieve all those goals. That is the reason we want to do our upfront homework properly so that before we start full-scale engineering development, we can say this is what we require.

Senator GLENN. Are the weapon systems going to be coming along with this now and do you have any estimate of cost?

General WAGNER. We are using a standard weapon system that will be available at the time of fielding. We are designing no special weapon systems. There will be integration, but we are not designing new missiles and that sort of thing to put on it.

Dr. SCULLEY. By demonstrating this technology and doing the homework up front, we will be able to offer you a cost estimate with a great deal more confidence than we have today.

We would invite scrutiny.

General WAGNER. Very quickly on just a couple of joint programs.

JOINT TACTICAL MISSILE SYSTEMS ARMY(JTACMS-A)

- KILLS DEEP - DESTROYS ENEMY 2ND ECHELON
- BALLISTIC MISSILE FIRED FROM MLRS LAUNCHER
- NEW JTACMS/LANCE BATTALIONS AT CORPS
- NO FORCE STRUCTURE INCREASE
- FUE 4TH QUARTER, FY89
- FY85 FIRST YEAR OF FULL SCALE DEVELOPMENT (FSD)
- FY86 RDT&E: CONTINUE FSD, INITIATE IR TGSM DEMO

JTACMS

This is the Joint Tactical Missile Program, to attack the second echelon. We are developing a ballistic missile and one of the key things is that we will be firing it from our MLRS launchers so that we keep down the force structure and keep down the overall cost of the system.

We are also following the guidance of the Congress in fielding it as quickly as possible with a goal of 1989.

This is the cost of that program.

JTACMS-A FINANCIAL SUMMARY

PROGRAM UNIT COST
(CONSTANT FY86 $)

PLN EST FY 85	NA
FY 85	NA
FY 86	NA

NEW SAR

COST GROWTH

FY 85-86	NA
TOTAL	NA

		FY84 & PRIOR	FY85	FY86	FY87	TO COMPLETE	TOTAL
RDT&E		91.4	76.4	154.8	207.0	258.4	788.0
WPN SYS PROC		0	0	0	35.2	1164.2	1199.4
QTY	MSLS	0	0	0	0	[DELETED]	
	LNCHR	0	0	0	0		

$(000,000)

JOINT STARS

The joint surveillance and target acquisition system is on the C-18 I showed you. It is going to give us that capability to see at the ranges we need to see the second echelon.

We signed an agreement with the Air Force. They are going to develop the radar and we are going to develop the ground station. For the first time they have signed an agreement with the Army that will give us dedicated support for the Corps commander. We never had that before. We feel confident we can depend on the Air Force to do that job.

We are going to get better coverage with the current agreement we have with the Air Force than we would have had under the split Air Force/Army program we had a year ago.

JOINT SURVEILLANCE AND TARGET ATTACK RADAR SYSTEM (JOINT STARS)

- DEEP INTERDICTION PROGRAM, ALONG WITH JTACMS, JTFP
- AIR FORCE LEAD, USDRE MEMO 19 MAY 1982
- PRIME CONTRACTOR WILL DEVELOP RADAR
- CURRENTLY IN SOURCE SELECTION FOR FSED CONTRACT AWARD
- BIDS RECEIVED NOV 84, SSEB CURRENTLY EVALUATING
- GROUND STATION FSED CONTRACTOR - MOTOROLA: AWARDED ON 10 AUG 1984
- GROUND STATION MODULE UNDER CONTROL OF DEP PGM DIR (ARMY)
- ARMY WILL PROCURE 71 GSMs; CONTRACTED BY ERADCOM
- FY86 RDTE: GROUND STATION/DATA TERMINAL
- FY86 PROCUREMENT: N/A - BEGINS FY87

JOINT SURVELLANCE AND TARGET RADAR SYSTEM
FINANCIAL SUMMARY
(JOINT STARS)

ARMY:	FY84 & PRIOR	FY85	FY86	FY87	TO COMPLETE	TOTAL
RDTE:	108.3	50.0*	43.8	29.2	14.1	245.4
PROCUREMENT:	0	0	0	72.9	333.2	406.1
QUANTITY BUY:	0	0	0	9	62	71

*NOTE: AS SUBMITTED IN FY85 COLUMN OF FY86 PRESIDENT'S BUDGET, BASED ON REPROGRAMING ACTION. ACTUAL FY85 APPROPRIATION IS $30.0 MILLION.

AIR FORCE:	FY84 & PRIOR	FY85	FY86	FY87	TO COMPLETE	TOTAL
RDTE:	41.0	46.7	260.2	210.1	514.4	1072.4
PROCUREMENT:	0	0	0	0	511.3	511.3

$(000,000)

This is a joint program that is on track. This is the Army part of it. You can see the significant part is in the Air Force. We are the ground station business. This is what will be developed to get that information down from the C-18.

This is a concept of how it works. They will pass it down to our ground station module. Then it will go to the TAC FIRE/AFATADS and through ASAS, the firing units, air defense units and to the commander to assist in attacking the enemy force.

JOINT TACTICAL FUSION PROGRAM (JTFP) HIGHLIGHTS

- FIRST ASAS MODULE WILL BE FIELDED IN FY85
- FIRST COMPLETE SYSTEM FIELDED TO [DELETED]
- SYSTEM MODULE LIMITED PROCUREMENT DECISIONS FY86, 87
- OBJECTIVE SYSTEM IOC [DELETED]
- ACTIVE COMPONENT DIVISIONS AND CORPS FIELDED BY [DELETED]
- JPL SUBCONTRACTOR TEAM NOW COMPLETE
- DETAILED SYSTEM DESIGN/SYSTEM INTEGRATION CONTINUING
- FY86 RDTE: [DELETED]
- PROCUREMENT FUNDING BEGINS FY87

The next joint program is the Joint Tactical Fusion Program which is the intelligence program that we need. It is absolutely essential to us to make sure we can take the great magnitude of intelligence information and pass it on to the Commander. We are on track. We are going to field that initial system with a 9th motorized Division in fiscal year 1986 and make sure it works with an IOC objective in [deleted].

M1 TANK ENGINE

Chairman GOLDWATER. General, the chances are we are not going to get through in time. I want to engage Dr. Sculley in a few questions. This is relative to the M1 tank engine, second source.

The Army has procured approximately half of the projected M1 tank inventory. The Marines are also planning to buy about 500 M1's. There may be opportunity for foreign military sales of the tank.

Now, the question I have, Doctor: Given this substantial requirement for additional tanks, would it be wise to take advantage of the benefits of competition by developing a second source for the M1 engine?

Dr. SCULLEY. I don't know if I can answer that directly, but if you will permit me, Senator, to comment, we have an attractive multi-year proposal on the table now for the existing engine.

In thinking about this during the past year, since I feel that this current engine represents old technology, I would strongly advocate a development program that would bring a more efficient, more easily maintained engine to our tank fleet in the 1990's. I think if we are able to do this, we will have lower operating costs on the tank, more reliable engines, and receive the benefits that competition can bring.

General WAGNER. I think that is right, sir. The engine we have today is a good high performance engine. As you know from your experience with jet engines, it is not the technology that we have available today. If as a user I were to decide what I wanted to put in a tank, I would look at improving that engine or modifying it to give me a more efficient engine to cut down fuel consumption. We are looking to see if we can reduce our O&S costs, by maybe mounting it differently in the tank, perhaps transversely, to retrofit it over a time.

We are going to be coming back to give you more details on a program of that nature.

Chairman GOLDWATER. What analysis has been done to estimate potential savings from a second source?

General WAGNER. We have done considerable analysis on that. It is very close with the number we have right now, whether it would be cost effective or not.

The problem we run into is that, as you well know, we can't stop production.

It will take 2 to 3 years to bring on a second source. By that time the number that still has to be produced causes questions whether it is still cost effective. We are just about falling off the cliff right now.

If we could move out today and had the money, it is conceivable it would still be cost effective.

Chairman GOLDWATER. I would hope you would go ahead with a full study of this. I am not thinking of the possible need for a second source during peacetime, but if we ever have to go to combat and we are talking about utilizing the full inventory of tanks, one engine supplier is not going to be able to hack it.

General WAGNER. That is right.

Chairman GOLDWATER. As Chairman of the Tactical Warfare Subcommittee, I recommend a second source again this year. I am not going to have an easy time of it in the House and you know why. But the stronger case you make for it, the better, and I think it makes a lot of sense even if we don't have a situation where an emergency exists, we would have a competitive situation that would result in probably a better engine.

Dr. SCULLEY. We certainly agree, Mr. Chairman.

I would also state that the initial study that I authorized for looking at the second source was under exception 16, mobilization considerations. So, we certainly agree in the Army.

Chairman GOLDWATER. I hate like the devil to leave you, but this is a weekly meeting. By the time I get there, it will be going on. I have to duck out.

I think you have left about four subjects. If you would care to put those in the record in any way, that is perfectly all right with me.

I apologize for having to leave, but there is not much we can do about it.

I do thank you for coming over. It has been a very interesting program. I just hope you can make that Divad work.

Dr. SCULLEY. We will.

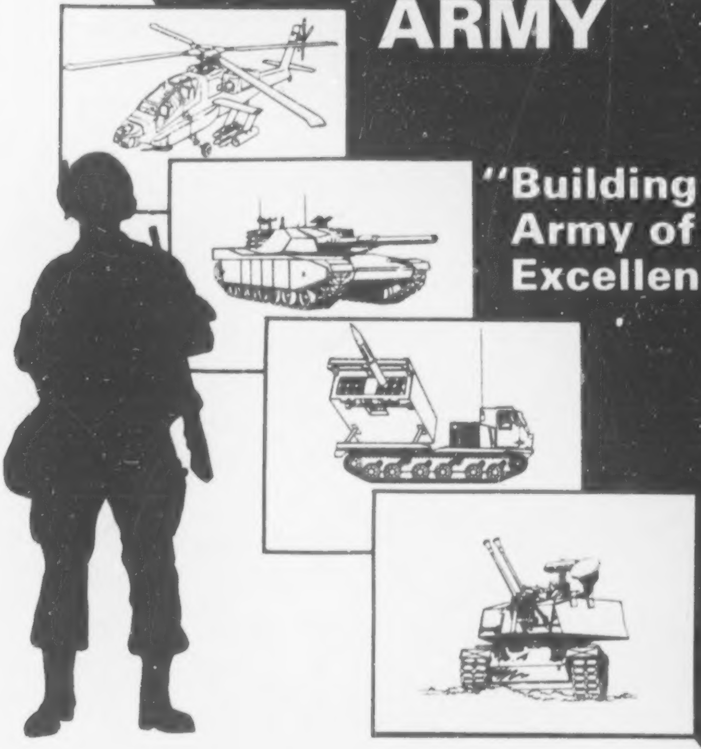
Chairman GOLDWATER. It is a fine weapon, but you are not going to get to first base if it doesn't work.

Thank you.

Dr. SCULLEY. Thank you, Mr. Chairman.

[The prepared statement by Dr. J.R. Sculley and Lt. Gen. Louis C. Wagner, Jr.: "Equipping the U.S. Army; a statement to the Congress on the FY86 Army RDTE and Procurement Appropriations" follows:]

EQUIPPING THE UNITED STATES ARMY



"Building An Army of Excellence"

Statement to the Congress on the
FY86 Army RDTE and Procurement Appropriation

INTRODUCTION

The Army's research, development, and acquisition program has continued to lead us towards achieving our critical goals of modernization of equipment, improved readiness, and sustainability. The benefits of our research, development, and acquisition planning are now being realized as many new and improved systems are being fielded. This leap forward in the technology, and effectiveness of our systems is exciting to all of us, and primarily so for the soldier in the field using the systems. Testimonials from the real users--the PFC Joneses and the SGT Smiths--make us confident that we are providing soldiers the tools they want and need to accomplish their mission. The systems being fielded allow them to perform to their maximum potential in preparing to meet any enemy threat. These are good indicators that we are not only making substantial progress in the research, development and acquisition area, but following through by fielding new equipment properly.

In FY86, we continue the long-term program of equipping our forces with the systems required to gain a qualitative edge over the Soviets. We ask your continued support in this effort; however, we are mindful of the necessity of reducing the deficit, and consequently remain committed to ensuring the dollars provided us are used wisely and efficiently. The continued support of the Army's equipment modernization program displayed by the Congress is paying dividends. As we move into the FY86 budget cycle, it is essential this positive trend continues to enable the Army to eliminate obsolescence, fill shortages, and strengthen our position relative to probable adversaries.

The FY86 combined procurement and RDTE request is for $26.6 billion. These funds will continue the improvement of the Army's near-term readiness posture, continue to modernize the total force, and support research and development. Progress has been made in meeting our requirements; however, the Army is still short materiel to bring units up to full equipment levels and to fill war reserve stocks. Units in the Active Components, National Guard, and Army Reserve do not have all the arms and equipment they require. Reduction of these shortages as quickly as possible is our highest priority. We must continue to procure additional quantities of equipment--currently fielded, product-improved, and new--for both Active and Reserve Components.

The need to fill shortages, particularly with new or improved equipment, is critical given the long-term quantitative and qualitative trends in the Soviet ground forces and expanding Soviet power projection capabilities. In order to support their massive ground force--approximately 200 divisions--and numerous Army and higher echelon units, the Soviets have created a modern, professional, efficient weapons and combat development process. Its output is primarily designed to counter their major adversary--NATO.

The Soviets tend to upgrade their weapon systems on a smooth, continuous 10- to 12-year cycle resulting in regular output and little or no lag time between successive generations. The overall result is an impressive system for force modernization based on many evolutionary, closely spaced changes. The result is a quality upgrade while maintaining the quantitative advantage with little or no impact on the user.

The Soviets' pragmatic approach to weapon system modernization also provides funding stability. Engineering design changes are controlled and continuous while stressing the use of common components throughout successive generations of a particular weapon system. Key personnel are stabilized in order to retain the management experience vital to successful programs. Although the Soviets have long maintained a sustained, accelerated modernization effort, it accelerated in the mid-1960s and is continuing at a rapid pace today. In the same timeframe, our priorities were directed toward the war in Southeast Asia, which diverted resources from modernization. The after-effects of that conflict and resulting budget constraints further slowed development and modernization efforts. As a result, the Soviets have generally fielded two and sometimes three generations of improved equipment while we fielded one.

In addition to these more frequent development cycles, the Soviets' large procurement budget has allowed them to introduce equipment into their inventories at considerably higher rates than the U.S. ground forces. Cost comparisons of U.S. and Soviet ground force procurement programs for 1975-1982 indicate that the long-term nature of high procurement outlays has enabled the Soviets to procure systems at a greater rate than the U.S. With all their strengths, however, the Soviets do have vulnerabilities which we are exploiting through our development and procurement efforts. We do not attempt to match the Soviets tank for tank. Our objective is to identify the total threat and then structure systems development and procurement to capitalize on their vulnerabilities.

Prior to the last ten years, we had historically maintained a constant advantage in system quality when compared to the Soviets. However, during the 1970s to the present, the qualitative edge has slowly been eroded, and Soviet systems reflect steady evolutionary progress yielding significant improvements in operational capabilities of range, speed, accuracy, payload, and lethality. For example, Soviet tanks have been undergoing major upgrades since the mid-1960s. At least three new models have been introduced along with several modifications and variants. Each succeeding model or variant has demonstrated improvements in the areas mentioned; in some cases, surpassing the technology advantage we enjoyed. In the Soviet forces opposing NATO, these newer tanks comprise about 50% of the tank inventory. Within the last two years, the Soviets produced, on the average, approximately 2700 tanks and 4500 other armored vehicles per year. We are attempting to counter this extraordinary armor buildup with an anti-armor enhancement initiative (AEI). The AEI will provide our tanks with needed lethality against projected Soviet tank armor.

Attack helicopters are another area where we have lost the qualitative and quantitative edge. Soviet helicopters are the most heavily armed in the world, and the Soviets continue to develop more agile, powerful helicopters such as the HAVOC. Because of tactical necessity in Southeast Asia, we led the way in attack helicopter development with the AH-1G Cobra. It has subsequently been product-improved through several versions of the AH-1S, and will continue to see service beyond the year 2000. Unfortunately, the AH-1S can't be improved to match the current Soviet threats. To counter these threats and provide a better attack helicopter, the AH-64 Apache was developed and will soon be fielded in our attack helicopter battalions.

The Soviets are pursuing a comprehensive program of both upgrading and expanding artillery, rocket, and missile fire support available to their own ground forces and those of their allies. They have fielded two new 152mm guns, one self-propelled and one towed, since 1978. The new guns are nuclear capable and replace systems that are not. At division and above, the Soviets are continuing deployment of nuclear-capable, heavy artillery brigades armed with 240mm self-propelled mortars and 203mm self-propelled guns. A 220mm multiple rocket launcher began deployment against NATO in 1978. Concomitant with the deployment of the SS-20 tactical ballistic missile in 1977, the Soviets began a concerted effort to modernize and expand their nuclear surface-to-surface missile forces. The rapid expansion of Soviet delivery capability caused us to place emphasis on protecting our systems against electromagnetic pulse (EMP) damage. Significant improvements marked by increased numbers, types, sophistication, accuracy, yields, and reliability were made as the SS-21, SS-22, and SS-23 began to replace older tactical missiles. Deployment of several variations of cruise missiles will take place in the next few years and provide even greater fire support for Soviet ground forces.

Soviet doctrine for air defense calls for denial of the airspace over and adjacent to the battle area. To accomplish that they have deployed eight surface-to-air tactical missile systems, plus variants, and are developing an advanced tactical air defense system, the SA-X-12. Their highly effective self-propelled antiaircraft gun, the ZSU-23-4, has been in production since 1965 and is due to be replaced soon. The multi-echelon, highly mobile, continuously overlapping tactical air defense systems have no comparable combined arms counterpart in the U.S. Army in either hardware or employment concepts.

The Soviet Union has the world's largest, best equipped, and best trained military force for waging chemical warfare. Soviet research and development programs indicate a serious effort to develop new chemical weapons with the capability to defeat protective masks and filtration systems of potential enemies. Other areas of combat support such as engineer equipment and electronic warfare reveal balanced, sustained efforts to provide the full range of functional capabilities required by Soviet tactical operational doctrine.

Soviet ground formations hope to achieve an average rate of advance of 50 kilometers per day in a theater strategic operation. Transport helicopters and aircraft are provided to insert airmobile and air-assault units rapidly to tactical and operational depths ahead of, but as part of, the overall main attacks. In the past several years, the heavy-lift Mi-26/HALO helicopter, which is significantly more capable than our CH-47D helicopter in load and lift capability, has been deployed. Motor transport units have benefited from successive generations of trucks having outstanding off-road mobility and increased payloads. For transportation of fuel, Soviet pipe-laying units are capable of laying approximately 80 kilometers of pipe per day using specialized automatic pipe-laying equipment.

Although hampered by computer hardware manufacturing and software limitations, the Soviets continue to give high priority to command, control, and communications. Its importance is recognized in achieving and maintaining the desired high rates of advance of their combined arms forces and close control of rapidly moving combat support units. The Soviets have fielded older computers and software technology and work on its applications to planning and command and control. Then they upgrade as new technologies become available, just as in other weapons and systems programs.

Soviet global power projection is geared to take advantage of new technologies. As new weapons are introduced, older weapons continue to be channeled into third-world countries in support of political/military doctrine. For example, in addition to an active ground force about twice the size of ours, large numbers of Soviet advisors and units are deployed around the world. It is estimated that Soviet strength in Afghanistan exceeds 100,000; Cuba 13,000; Algeria 8,000; Syria 5,000 and India 1,600. One of the major duties of these advisors and units is to train host nations in the use of newly introduced Soviet equipment. To date, equipment introduction has spanned the spectrum from old to the most modern depending on the nation involved.

The long-term and continuing commitment by the Soviets to force modernization is evidenced in their political and military doctrine, the buildup of their post-World War II military industry, their extremely large and continuing capital investment and the very nature of their centrally planned economy. Soviet ground force modernization is not just a militarily peculiar series of programs but also a long-term government and societal commitment.

The only way for the U.S. to overcome this threat is to vigorously pursue our technology advantage and use that technology to modernize our force. The U.S. Army's research and development efforts of the past decade have been successful and are resulting in the fielding of superb equipment. Examples of these successes are discussed later. This is occurring just as the Army is in transition from an Army of the 1980's to an Army of the 1990's. However, it is imperative that we continue to design and develop forces and equipment to meet the constantly increasing threat in the years ahead. The AirLand Battle Doctrine provides the doctrine for which weapon systems must continue to be developed to assure its success, even while we are fielding a new current generation. Current equipment modernization designed to assure compatability with force design and doctrine includes the Patriot air defense system, the SGT York air defense gun and the Apache attack helicopter, which are just starting fielding and full production. Systems such as the Abrams tank, Bradley Fighting Vehicle, Blackhawk helicopter, Pershing II missile, Multiple Launch Rocket

System and Stinger air defense missile are continuing to be fielded as quickly as affordable.

Absolutely essential to current doctrine is the need to synchronize all available combat power against the enemy to the full depth of his forces. The AirLand Battle is one battle consisting of three parts: deep attack, close-in, and rear battle. The synchronization of weapon systems for the three parts of the battle is essential to provide the commander the combat power to win the key battle along the forward line of troops (FLOT). Continued research, development and acquisition is essential to provide follow-on systems for future synchronization on the battlefield.

Depth is one of the operational concepts that is at the core of the AirLand Battle doctrine. The deep battle portion of the AirLand Battle seeks to delay, disrupt, or destroy the enemy's succeeding echelons and isolate committed forces. It also prevents the enemy from attacking our units with fresh troops. Systems such as the Remotely Piloted Vehicle (RPV), Joint Surveillance and Target Attack Radar System (JSTARS), Joint Tactical Fusion Program (JTFP), Multiple Launch Rocket System (MLRS) and Joint Tactical Missile System (JTACMS) are key to allow the combat commander to detect, identify, and attack deep targets.

The rear battle area is just as important as deep attack. The commander must allocate combat power to protect the rear battle area. The allocated combat power is designed to counter threats or potential threats and to provide deep strike reserve forces. Air defense of the rear battle area is essential to the execution of AirLand Battle. Patriot, Roland, Improved Hawk and Chaparral will provide this protection. Another step to enhance protection is through the U.S./Federal Republic of Germany (FRG) Air Defense Agreement. Our West German allies will man Patriot and Roland batteries to protect both our rear area, as well as their own, and air fields within the FRG in return for providing them Patriot equipment.

The primary objective of both the deep attack and rear battle forces is to provide the commander the ability to destroy the enemy close-in along the FLOT. Therefore, weapon systems must possess greater mobility and agility on the battlefield. The Abrams tank and the Bradley Fighting Vehicle systems have the capability to be able to rapidly close with the enemy. The Apache attack helicopter is key because it provides the rapid reaction vital to close-in support. At the same time, the SGT York and Stinger provide the air defense protection needed to execute decisive action at the FLOT. The key elements which tie the total effort together and allow the combat commander to control his manuever elements are his communications, command and control equipment. Systems such as Mobile Subscriber Equipment/Joint Tactical Communications (MSE/TRI-TAC), Single-Channel Ground and Airborne Radio System (SINCGARS), Army Data Distribution System (ADDS), and Joint Tactical Fusion System are a must to ensure success.

The U.S. Army must be prepared to fight anywhere our national command authority deems necessary to national security interests and conduct operations across a wide spectrum of conflict ranging from terrorism to nuclear exchange. While conflict against the Warsaw Pact in Central Europe remains the most dangerous threat to U.S. security, it is not considered the most likely. Resource dependency, the proliferation of arms to include a nuclear capability among Third World nations, and worldwide turmoil make it necessary for the U.S. to develop forces which can operate in all types of terrain, climate, and levels of warfare. U.S. fighting forces must be prepared to react rapidly to several situations at once. Predeployment, force structuring, readiness, and worldwide command and control will be tailored for these contingencies. The potential for conflict is global, and the Army must have the proper balance of forces between heavy and light divisions to rapidly deploy, reinforce, sustain, counter terrorism, and maintain a worldwide capability.

It is important to note that our modernization effort also applies to the Reserve Components, a key element of our Total Army. National Guard and Army Reserve units are receiving and will continue to receive new and improved systems as part of the total force. Their requirements are built into the Army's acquisition plans to cover the full spectrum of their mission needs. For example, a battalion of the North Carolina National Guard has received Abrams tanks and Bradley fighting vehicles. Three more National Guard Abrams and Bradley battalions will be fielded this year. Additional systems such as Roland and Stinger air defense systems, utility helicopters, upgraded Cobra attack helicopters, and other essential systems are being issued to reserve component units. The FY86 budget includes provisions for a number of accelerated Reserve Component equipment packages. The request which is designed to improve Reserve Component equipment and manning includes: accelerated upgrade of tanks to the M60A3 and conversion of AH-1G Cobra attack helicopters to the S model.

The total force mentioned above isn't completely dependent on all new equipment and it would be incorrect if you were led to believe that the Army's materiel acquisition philosophy dictates a new development program for every change in the threat. On the contrary, we recognize that we live in a world of constrained resources and must take maximum advantage of the investment we have made in fielded systems. To do this we have used, and will continue to use, product improvement programs that are designed to build on those systems that are currently in the inventory.

The M60 tank--a product of the late 1950s technology--is one example of evolutionary development through product improvement. Improvements that have been made to the basic M60 tank include engine changes that have upgraded reliability and maintainability, a stabilization system for shoot-on-the-move capability, and a passive night sight to improve night vision. The latest version, the M60A3, incorporates a laser rangefinder, thermal sight which penetrate darkness and obscurants, and a ballistic computer which automatically inputs to the gun data such as range and moving target lead angle. The result is a 20-year-old tank design that continues to be a formidable weapon on today's battlefield.

The CH-47 Chinook medium-lift helicopter and the Army Helicopter Improvement Program (AHIP) are also examples of our product improvement programs. The modernization programs currently underway will extend the useful lives of both aircraft beyond the year 2000. The Chaparral and Hawk air defense systems, the TOW antiarmor missile, and the Cobra attack helicopter are but a few of many other systems that have had their operational capabilities upgraded and lifetimes extended by product improvement.

It is recognized, however, that the improvement potential of any given system is limited, as both technology and the threat continue to change. For example, some of our current air defense systems were simply not designed to function in the sophisticated electronic countermeasures (ECM) environment of the Soviets. These systems are also incapable of multiple target attack and track engagement operations. The technology that could provide a capability to operate in an ECM environment and attack and track multiple targets did not exist when the old systems were built. It was impractical to attempt to build it into them; therefore, we had to develop new, more capable weapons. For example, Patriot and Stinger, the products of the decade of successful research and development we referred to earlier, are ready to fill the gap where our older systems, Nike-Hercules and Redeye, were found to be inadequate, and where potential for improvement had been exhausted.

Modernization of existing systems and development of new systems will be accomplished by joint development with other services where it is cost effective. Today, there are many efforts underway in the promotion of joint R&D, as well as procurement. Three of these systems have already been mentioned; however, addressing this important issue separately is worthwhile.

The purpose of a joint program is to develop and field a system that meets the needs of two or more services. The Joint Surveillance and Target Attack Radar System (JSTARS) is a joint Air Force-Army program designed to provide a single system for wide area surveillance of fixed and moving targets. Examples are moving ground targets, command posts and assembly areas. The Air Force gathered data is quickly fed to the Joint Tactical Fusion Program's (JTFP) All Source Analysis System to develop quick-reaction targeting information. From there it becomes a realtime fire mission and is processed as information leading to future fire missions.

The Joint Tactical Missile System (JTACMS) fulfills the need to destroy, neutralize, disrupt, or delay enemy second echelon forces at ranges beyond the capability of the cannons and rockets assigned to the Corps. Degrading the enemy's ability to reinforce and support the central battle increases friendly forces' chances of overcoming expected unfavorable force ratios at the FLOT. The missile will be transported and launched from the Multiple Launch Rocket System launcher.

Additional systems currently under joint development are the Joint Antitactical Missile System (JATM) and the Joint Tactical Information Distribution System (JTIDS). These systems are designed to interact on the battlefield to provide the combat commander real-time data information to perform a follow-on mission as required.

With the introduction of the equipment now entering production we are well on the way toward correcting current Soviet qualitative superiority in many systems. To preclude a future Soviet edge in quality and to make sure we are not surprised by a threat we would be unable to counter, we are pursuing an aggressive research program.

The Army research and development program includes scientific research and exploratory development (referred to as our technology base) and developmental and engineering efforts directed toward improving current systems, and developing new weapons and equipment in the near future. In the FY86 budget request, approximately 15 percent of our research and development funds go to the technology base and the remaining 85 percent to developmental and engineering efforts. Recognizing the enormous technology support available in the academic community and in commercial industry, the Army has chosen to focus its technology base on those areas of highest military payoff. Selection of which research and development projects to pursue is based on an assessment of enemy threat, Army structure, and an analysis of how and when the technology can be applied to Army systems.

Our developmental and engineering research and development efforts are oriented toward the fielding and improvement of specific systems. Such directed efforts have resulted in the development of new systems across the entire spectrum of our mission areas--the Abrams tank and Bradley Fighting Vehicles, the Apache attack helicopter, the Patriot and Stinger air defense missiles, the Multiple Launch Rocket system, and many others. Additional systems such as the Remotely Piloted Vehicle (RPV) and Army Helicopter Improvement Program (AHIP) are in the final stages of development.

The importance of an adequate research and development program has seldom been greater. Today the Soviet Union supports about twice the effort that we do in military research and development and is graduating five times as many engineers. The quality of their weapons has continued to improve because of their past R&D investment, and because of the size of their present program. We are now faced with the additional risk of technological surprise. We need your support to prevent that from happening.

Before we move on into the mission areas of this year's posture statement, it is necessary to discuss some RDA initiatives vital to the entire effort described thus far. As already mentioned, deficit spending has resulted in a tightening of budget pursestrings. To realize best value for dollars spent, we are looking closely at nondevelopmental off-the-shelf items as a clear way of saving R&D money. The industrial base helps the Army's R&D effort by developing items for civilian use that are compatible with military requirements. In addition, if an allied nation has developed a system which meets our needs, it is economically wasteful to develop the same or a similar system. The procurement of nondevelopmental items is not new, but deserves new emphasis by everyone in the acquisition process. The Army must increase its use of state-of-the-art commercial items produced in existing commercial facilities. Prime examples of these are the Commercial Utility and Cargo Vehicle (CUCV), which serves not only Army needs but also those of all the Services, the Heavy Expanded Mobility Tactical Truck (HEMMT) and Mobile Subscriber Equipment (MSE).

Industry can help in advanced materials research. We need lighter and stronger materials to lighten our military vehicles. For example, kevlar-reinforced hulls have the potential of upgrading armor-piercing protection from 7.62mm (steel) to 14.5mm (tungsten carbide) bullets without any increase in hull weight.

We are also seeking industry's guidance as well as using our own knowledge to improve testing techniques. Results are already evident with initiatives such as the modernization of the Army's major ranges and test facilities. Dugway Proving Ground, Utah, is a good example. Test facilities, family housing, new automated test grids and new construction for operations are either planned or underway. White Sands Missile Range, New Mexico, will replace nine single object tracking radars with three multi-object (ten target) tracking radars. In the procedural area, initiatives are being developed to provide for evaluation of systems throughout the life cycle and not just at milestone reviews. Data collection and processing will be accomplished in near real time. Combined operational and developmental testing will occur more often. Emphasis will be placed on operational testing of production representative prototypes. Other measures are also being used such as using off-shore and/or industrial test results rather than duplicate testing, thereby saving R & D dollars. The foregoing initiatives will enhance the probability of achieving a four year acquisition cycle from conceptual phase through contracting for initial production. The Army is also firmly committed to improving acquisition management. We believe our current efforts are paying off with lower costs and more coherent and stable acquisition programs. Our limited dollar and manpower resources are being managed more intensively than at any time in our past, and we will continue to move ahead on the way we do business.

Multiyear contracting is a means to reduce costs, prevent program stretchouts, and ensure more rapid fielding of new systems. The Army has historically used multiyear procurement for components and nonmajor systems. In fiscal 1982, the Blackhawk airframe became the first major system identified for multiyear funding. The projected 3-year savings is $81.1 million. Additional multiyear funding projected savings for systems range from $131.1 million for M1 Fire Control to $209.1 million for MLRS. We strongly support multiyear contracting and plan to continue to use it; however, we also recognize that it is not suited to every materiel acquisition program. A selected system must have validated cost savings, stable funding, and a stable design before it makes sense to utilize a multiyear contract.

The above criteria are enhanced through the use of increased competition in contracting. We are committed to competition. All major systems/major components currently in the development phase of acquisition are reviewed to determine if competition is being planned and if additional funds would be needed to enhance competition. To sum up, these are challenging times for research, development, and acquisition. Our Army requires a materiel acquisition program that will modernize and equip the force in a timely manner, and protect its future. The picture is brighter now than it has been in a long time, and our challenge is to keep it bright. To do this, we need your support to prevent any slip backwards; without your support, we place our forces and the security of all free societies at great risk.

TECHNOLOGY BASE

The Army's long-range acquisition plan was mentioned previously in connection with our efforts to stabilize the acquisition process. Our long-range plan also provides the focus for the Army's technology efforts and the overall research and development program. This is extremely important, since we must rely on our technical capability in order to balance Soviet quantitative and qualitative superiority.

This year's long-range plan covers 15 years--FY87-2001 and describes how the Army will develop and acquire the materiel it will need to fight in the 1980's and beyond. It also allows us to examine affordability early in the development process. As part of the plan's formulation, Army Staff planners look to both the combat developer, who speaks for the soldier in the field, and the materiel developer, who analyzes our technology. In this fashion, the long-range plan balances our needs with opportunities and capabilities offered by modern technologies. This balance insures that we are on the correct path to achieve the global response capability our Army requires. Our objective is to retain technological superiority where we have it, regain it where we have lost it, and exploit it to maximize combat effectiveness.

The battlefield of the 1990's and beyond will require Army forces that are light, agile, and lethal. These forces will have to fight a very "fluid" type of combat, often operating independently from other forces. They will have to fight enemies that could be superior in firepower and in numbers. To meet the challenges of the 1990's and beyond, the Army will place greater emphasis on "leverage" technologies which offer the potential for innovative, revolutionary change in military systems and capabilities. Examples of such technologies include:

o VHSIC (Very High Speed Integrated Circuits) which will provide the computers and processors needed to refine and integrate battlefield data and aid in tactical decision making, for automatic target recognition and battle management. Development of new semi-conductor materials such as Gallium Arsenide will permit these capabilities to be realized with smaller systems that have lower power and cooling requirements.

o Advanced visible and infrared technology which will greatly improve our capabilities to passively detect and identify targets at night or under adverse observation conditions. Developments in focal plane arrays, charge coupled devices and other detector technologies will permit achieving these capabilities in the near future.

o Millimeter wave technology which will permit a sensor to "see" and terminal homing missiles and artillery rounds to engage targets through battlefield smoke, fog, and dust.

o Advanced composite materials technology to provide high strength, light weight, survivable, corrosion resistant component materials which are producible at high rates and from domestically available materials.

o Genetic engineering which can be used to develop chemical and biological detection systems, vaccine antidotes, and other compounds for prevention and treatment of casualties.

o Robotic/Artificial Intelligence systems to optimize the results that human operators can obtain from machines and also permit remote controlled hazardous operations.

o STARS (Software Technology for Adaptable Reliable Systems) to permit the exploitation of computer technology through the disciplined development of software.

o Computer aided design techniques, manufacturing and inspection procedures to produce much lighter weight and reliable combat vehicles which will provide enhanced mobility and require less logistic support.

o Logistics research and development to enhance weapons systems reliability, free supply and maintenance personnel for increased fighting strength and reduce operating and support costs.

The Army's new thrusts in technology are designed to integrate, focus, and apply high leverage technologies in the following areas:

o Very Intelligent Surveillance and Target Acquisition (VISTA) technologies will permit the combination of sensor systems and the "fusion" of information needed by Army commanders in a rapidly changing battlefield environment. The near-realtime presentation of ground based and airborne radar, optical and human intelligence will increase effective use of our Army's fighting assets. Technology efforts will include ground and aerial VISTA platforms and mobile ground Combat Information Processors (CIP).

o Distributed Command, Control, Communications, and Intelligence (DC^3I) technologies will dramatically improve reliable distribution of battlefield information among all levels of command. Use of digital burst transmission techniques, millimeter wave and higher frequency spectra and fiber optics will provide greater jam and intercept-resistance, and needed continuing information transmission. Technology efforts will focus on distributed command and control networks and VISTA communications networks.

o Munitions technologies will allow munitions to autonomously search out, select, and home on hostile targets. Expected benefits include increased "kills" per missile or round fired, greater survivability for the launch vehicle or battery, and lower cost per kill. Technology demonstrations will include a multi-role survivable radar for air defense systems and continuing efforts on fiber-optic-guided munitions.

o Soldier-machine interface technologies will improve training, expand individual capabilities, and make it easier to operate sophisticated equipment. The precepts of effective soldier-machine interface will underlie all other technology thrust efforts and will also be emphasized in ongoing engineering developments and product improvements through increased emphasis on human factors engineering analysis.

o Biotechnology offers the opportunity to assist in the prevention and treatment of casualties through new classes of vaccines, antidotes, and treatment compounds. Several approaches, including monoclonal antibodies and recombinant DNA, make it possible to engineer very specific biological elements having highly effective diagnosis, prevention or treatment properties. Technology demonstrations will include a system for detecting chemical and biological agents, systems for rapid identification and diagnosis of disease, and various new vaccines.

AirLand Battle Environment (ALBE) has the goal to provide the Army with the operational capability to assess and exploit the battlefield environment and conditions. It does this through sensors that continuously sample the battlefield and its environment. ALBE collects data on terrain, soil and vegetation. It also assesses capabilities of U.S. and enemy systems to provide the commander information to optimize effectiveness as a function of the total battlefield environment.

Systems are becoming more complex and more integrated. At the same time, there is a need to reduce maintenance manhours, operations and support costs on new systems. A solution is under evaluation called Expert Diagnostics

System. It captures the cognitive skills of expert maintainers and diagnosticians and makes them available to the novice. The results are that the novice becomes more expert as experience accumulates and, ultimately, the expert system becomes even smarter.

Since FY83 the Army has focused its technology base resources on these leverage technologies and thrust areas in order to accelerate their application through force modernization product improvements and in evolving new systems. For FY86, funding will be increased in communications, electro-optics, biotechnology, human performance, logistics research and development, and electro-magnetic pulse protection technologies.

MEDICAL RESEARCH

Together with modern battlefield weapons systems, the soldier must be considered a "system" and, as the operator, is the most vulnerable and critical component in the array of battlefield systems. The Army medical research and development program is geared to address performance degradation factors that could make this system inoperable or cause it to operate at reduced efficiency due to physical, psychological, or disease-related stresses in a variety of climates and hostile environments, both in peacetime and during periods of hostilities.

Many of the normal, daily hazards to the soldier come from sources such as blast overpressure from artillery, combustion fumes from explosions, and radiation from laser, microwave, and radar systems. Army Medical Research addresses these environmental and occupational hazards.

Advances are also being made to aid the soldier in dealing with natural stresses. These include heat, cold, altitude, sleep deprivation, exhaustion, and the psychological strain of the battlefield. However, our personnel are more likely to become casualties from infectious diseases that have decimated military forces during past wars than from any manmade weapon system. Exploiting high payoff technological opportunities in the development of drugs, vaccines, and devices for the diagnosis, prevention, and treatment of communicable diseases is crucial for success in this area. Monoclonal antibody productions, genetic engineering, novel drug delivery systems, immune enhancement, and biomicrosensor development are being actively pursued.

Recent advances in biotechnology are being utilized to speed the process of vaccine development. A notable accomplishment in this area was the development of monoclonal antibodies against the principal antigen of the falciparum malaria sporozoite. This accomplishment facilitated the cloning of the corresponding gene into a vector microorganism. Expression of this gene by the vector may lead to the production of an antigen suitable for use as a malaria vaccine. This strategy is being applied to the development of vaccines against other stages of the malaria parasite and the parasitic diseases African sleeping sickness and leishmaniasis. A recombinant organism derived from shigella bacteria and an oral typhoid vaccine was shown to be safe and is effective in preventing bacillary dysentery. Passive protection against pseudomonas infection by monoclonal antibodies was demonstrated. Recombinant DNA and monoclonal antibody techniques were used to prepare diagnostic reagents field kits for use in rapid identification of BW agents and natural diseases in the field.

Field trials of new drugs were undertaken to evaluate their efficiency against multi-drug-resistant strains of falciparum malaria in Thailand. Investigation of the biological mechanism of action of the unique antimalarial natural product, artemisinine, was initiated. Novel drug delivery systems for the enhancement of the effectiveness of antileishmanial drugs are under investigation, as well as the use of antipenetrants for the prevention of schistosomiasis. The use of ribavirin as a prophylactic antiviral agent is being evaluated. Reformulation of insect repellents via microencapsulation was shown to increase their persistence.

During periods of hostilities, the soldier may be incapacitated or at reduced efficiency due to the effects of chemical, nuclear, or biological weapons. In support of the soldier on the modern battlefield, new techniques in disease prevention, self-treatment, patient management, resuscitation, and decontamination have been and are being developed. An effort was initiated to repackage the cyanide antidotes, sodium nitrate and sodium thiosulfate for inclusion into the chemical treatment set at battalion aid stations. In the laboratory, methods were developed to measure chemical warfare agent breakthrough and retention time, decontamination effectiveness, and enzyme release in the skin. Laboratory screening of hundreds of compounds for effectiveness against chemical warfare agents was accomplished. Several appear to be more effective than the current therapeutic agents and are undergoing definitive testing. In FY86, plans include: the developmental testing of an individual resuscitation device; clinical evaluation and developmental testing of prototype vital signs and heart rate monitors; and clinical studies on new soldier/patient skin decontamination materials. In addition, research continues on understanding the mechanisms of action of chemical agents, pretreatment, and therapy compounds.

Improved treatment of combat casualties requires earlier diagnosis and treatment of hypovolemic shock. In addition to improved resuscitative fluids, drugs that may "buy time" until adequate volume replacement can be effected are under investigation.

Research aimed at reducing mortality and morbidity due to head missile wounds is a high priority. Improved management of burn wounds is sought through improved dressings, skin substitutes, and epithelial growth systems.

Combat medical materiel items being developed include field production of oxygen and grade IV water, field medical refrigerator, heated patient liner for the transportation of casualties, and wheeled litter carrier.

Research in the area of combat dentistry currently includes the following major efforts: the development of synthetic, biodegradable implant materials to replace missing facial bone segments that will accelerate wound healing and simplify final surgical reconstruction; the development of facial armor to reduce the mortality and morbidity from maxillofacial wounds; and the development of improved, lightweight, low-cube dental field equipment.

Significant achievements during the past year include: the development of a brassboard prototype of the field dental drill; the development of bone implant materials that improve osseous healing; refinement of microencapsulated antibiotics and antibiotic-loaded wound bandages capable of sustained, controlled time release of drugs; initial development of a computer-aided post-mortem identification system; and initiation of electromagnetic pulse testing of dental and medical equipment.

Short-term goals include: continued development of biodegradable bone replacement materials; clinical trials of microencapsulated antibiotics and antibiotic-loaded wound dressings; field testing of the lightweight, low-cube field dental drill and x-ray which have been developed; implementation of the computer-assisted post-mortem identification system; and completion of electromagnetic pulse testing of all dental and medical equipment.

Research in stresses to the soldier-operator produced by materiel systems, battlefield environments, and natural environmental extremes has resulted in: revision of military standards for carbon monoxide exposure; acquisition of laser and ballistic eye protection prototypes; and initiation of performance evaluation of soldiers in extended operations under NBC conditions. Anticipated FY85-86 efforts include: development of field water quality standards for potability emergency conditions and long-term use, approximately one year, to include health protection and palatability considerations related to increased consumption in arid and arctic environments; development of blast overpressure standards; development of criteria for military unique field nutrition; development of criteria for prevention and treatment of acute mountain sickness; continued efforts in development of performance criteria for soldiers exposed to various manmade and naturally occurring stresses; and development of criteria for laser/ballistic protective eyewear.

These accomplishments are merely a few of the highlights of an extremely complex and broad research effort encompassing all aspects of potential hazards to the soldier, the crucial "system" on the technologically complex modern battlefield.

PROGRAMWIDE MANAGEMENT AND SUPPORT/RDTE MANAGEMENT

A critical foundation for the acquisition of materiel systems is the R&D management and support base consisting of the RDTE headquarters, supporting laboratories and test facilities. Success in acquiring modern systems is directly dependent on the welfare of this base. Dramatic advances in system technology and complexity demand a complementary modernization of this RDTE management base. The resources for RDTE and base operations must be commensurate with those of supported programs, to include funding, facilities, laboratory equipment, test instrumentation and high quality professional personnel. We must also provide resources for activities that are not related to specific RDTE projects, such as common service support at RDTE-operated installations and headquarters.

The need to upgrade and modernize laboratory equipment has become urgent, since much of it is based on 1950-1960 state-of-the-art. Application and exploitation of industry and government-developed technology is dependent on modern and well-equipped laboratories manned by trained, educated and experienced scientists, engineers and technicians. The upgrade is overdue and needs to be done as fast as we can afford it. A critical need is ultra high speed numerical computation capability to permit armor-antiarmor modelling, chemical defense analysis and systems synthesis.

Most of our laboratories exist in converted WWII production facilities and in buildings that were not established as foundations for research and development. Today's technology development must be accomplished in facilities that meet restrictions of EPA, OHSA and the Good Laboratory Practices. Our modified and altered laboratories have reached the limit of efficient expansion and many are extremely overcrowded, unsafe and deteriorating. Laboratory renewal and modernization has not done well in FY85 and the FY86 projects are needed to initiate a turn around for the RDTE laboratories in order to attempt to keep pace with this decade of technology expansion.

Our major ranges and test facilities conduct development and production tests to provide superior, supportable and survivable systems. The key to excellent and cost effective testing is the instrumentation for testing which must be as modern as the systems under test. Efficient instrumentation has a dramatic impact on the costs of testing as well as demonstrating that the systems will be operationally suitable. Testing must include realistic use in operational environments which requires special instrumentation and a good threat simulator capability. A major increase to the threat simulator program will, therefore, occur in FY86. Modernization of Dugway Proving Ground will continue to completely upgrade its test instrumentation facilities and housing to cope with the expanded test workload for chemical warfare, chemical and biological defense and smoke munitions systems. Since test facilities are RDTE installations, sufficient funds must also be included for base operations and logistic support, particularly for maintenance repair.

We urge your approval of the FY86 funding of this vital base which supports all we do in developing and fielding Army systems. The FY85 funding was less than adequate. Deterioration and obsolescence will increase. Requested FY86 funding will bring the base programs back to the necessary level of effort, while providing additional funds for modernizing Dugway Proving Ground. Your approval of these critical funds will provide for operating the base while keeping pace with new technology and checking deterioration.

MANAGEMENT INITIATIVES

This year is a continuation of the post-Vietnam revitalization of the Army's materiel acquisition program which recognizes the requirement for modernization of the force. We who are responsible for research, development, and acquisition of materiel systems are dedicated to improving our management techniques to improve the combat force. With the stabilization of the combat force, opportunities for concentrating additional resources to improving the posture of the Army can result in greater sustainability. Our management efforts are geared toward a major effort to provide a good framework for systems modernization Army-wide. The introduction of new weapons and materiel into the inventory during the 80's and 90's is important, as well as complex. Equally important to our overall posture are considerations and decisions associated with displaced systems and materiel. The entire effort has resulted in an affordability problem in the mid-80's when many of the new systems are scheduled to be fielded concurrently. All systems are required; however, it is improbable that funds will be available to field and support all of them in the desired timeframe. Prioritization of requirements is necessary as a basis for making difficult decisions on retaining those systems which provide the greatest overall contribution to our mission and deleting others in order to maintain program integrity of those retained. The earlier these decisions are made, the greater the benefit realized from not expending limited acquisition resources on development of systems which may never be procured. Therefore, contained in this chapter are initiatives aimed at the accomplishment of the research, development, and acquisition management goals. The actions we are taking include better planning, improved management information, greater use of multiyear contracting, improved risk analysis, linking cost estimates to the budget process, and better quality assurance management.

Better planning through our Long-Range Research, Development, and Acquisition Plan has resulted in greater program stability. The 15 year plan provides the Army's leadership a means by which to consider the future implications of current decisions. It facilitates the making of timely, logical, and economically sound decisions for the acquisition of materiel with a minimum of program disruption.

The Army's Program Management Control System (PMCS) provides improved management information. Seventeen major systems have been brought under PMCS. Eight additional systems are awaiting approval. Each system is baselined for cost, schedule, performance, quantity, production capacity, and integrated logistics support requirements. These systems are tracked monthly to detect deviations from baselines which cannot be changed without formal approval by the Department of the Army. This adds stability to the program. We have also begun a monthly program manager's status report for major systems designed to improve management information. It begins with the program manager's candid assessment of where his program stands. The Army Staff then analyzes the report and takes necessary action on problem areas. A final report is then prepared for the Army's top leadership. This monthly report and analysis has been helpful in preventing surprises and enabling us to step in and help the program manager when he needs the help - not after it's too late.

The Army has also initiated an expanded quarterly review of cost, schedule, and performance variances of those systems included in the Congressional Selected Acquisition Report. The review highlights problem areas and assigns responsibility for follow-on action.

Recognizing that stable design and stable requirements do not exist in all programs, the Army continues to improve its efforts in the area of program risk review. We have established a Cost-Risk Review Committee to examine systems that are approaching milestone reviews to provide a cost-risk assessment to key decision makers. These independent reviews are conducted on site at the contractor's facility and have been useful in bringing to light buried problems that represent cost and schedule risk to a program. Since 1982, risk reviews have been conducted on ten systems. There are five scheduled for 1986. Results of these risk reviews are combined with our cost estimates and expected funding level to yield an overall affordability analysis for our use in decision making and program funding formulation.

Steps are also being taken to improve the linkage between our cost estimating and our budget. In the past, baseline and independent cost estimates were prepared only for each milestone decision review. As a result, current cost information was not always available for budget input. We have now modified our cost estimating procedures to provide annual updates on all major programs. We are also developing new procedures to integrate the use of these annual cost estimates in developing our budget. By providing in advance of the budget decision process some discreet and executable program alternatives that have valid cost estimates, these alternatives can then be used with confidence for the trade-offs that always accompany submission of a budget or program. We are testing these new procedures on selected systems and expect to fully implement the process in our preparation of the FY87-91 POM this spring.

One of our most important Army acquisition management improvements is aimed at providing high quality, reliable equipment to our soldiers. We have a near-term program dealing with systems nearing deployment or in the field, coupled with a long range program dealing with institutional changes. Product and contract requirements for quality are being strictly enforced. Actual suspension and threats of suspension have resulted in significant improvements in quality. Defense Logistics Agency debarments and suspensions are up from 49 in FY81 to 150 in 1983. For the long-term, actions such as our quality assurance workforce upgrade, better development-to-production transition planning and independent design and quality reviews will result in it being done right the first time. We also conduct Contractor Assesment Reviews that bring together a team of Army experts to examine all aspects of the contractor's quality program. Reviews have been conducted for the M1A1, SINCGARS, SGT York-DIVAD, and Remotely Piloted Vehicle. We plan to complete approximately 14 contractor quality assessments by the end of FY85.

The Army is optimizing command application of audit findings. The Army Materiel Command Commander receives a daily audit information update. The initiative to develop an audit alert network to forward trend information will alert commanders to problem areas.

RESHAPE is the Army's comprehensive program for planning, executing and reporting all initiatives and programs to expand output, improve efficiency, and encourage and implement long-term productivity and savings. Today, the emphasis of RESHAPE has shifted to two major themes: investment in long-range productivity equipment and systems, and development of an auditable system to track savings in the budget system. During FY84 the Army integrated the DA/OSD Productivity Capital Investment Program into the RESHAPE program to maximize funding opportunities, reduce confusion, and provide economy in funding and executing projects. The central goal of the improved tracking system is to accurately reflect savings as an offset to requirements in the budget.

The Army's Domestic Technology Transfer Program is managed at Army Materiel Command for the entire Army. This program involves all 34 Army laboratories in positive efforts to identify appropriate technologies which may have some civilian or industrial application. Semi-annual meetings of representatives of all labs are organized by AMC to coordinate Army activity. The AMC coordinates all of this activity with the rest of the Federal government, with industry and participates in the Federal Laboratory Consortium for Technology Transfer. Cost/benefit is impressive when it is realized that every citizen enjoys continually improved quality of life from many spinoffs.

The Army recently implemented a new Equipment Redistribution Policy for major items replaced by force modernization equipment. This policy places redistribution responsibility on item managers and relieves the retail system of responsibility for directing redistribution of displaced equipment. The procedure was implemented to relieve the soldier from this burden and also to ensure that the highest priority unit gets the displaced equipment.

A new initiative to increase interchange between Army laboratories and field commands is the Science Assistance Program. Support to Eighth Army, Army Europe and Western Command is proceeding with the assignment of scientific assistants and representatives working with the Logistics Assistance Offices. Support to Forces Command and Southern Command is also nearing completion.

The Army is firmly committed to improving acquisition management. We believe our efforts are paying off with lower costs and more coherent and stable acquisition programs. Our limited dollar and manpower resources are being managed more intensively than at any time in our past and we will continue to move ahead on the way we do business.

BALLISTIC MISSILE DEFENSE

Since the March 23, 1983 speech by the President in which he announced the goal of eliminating the threat posed by ballistic missiles, a program called the Strategic Defense Initiative (SDI) has been established. The SDI, under the centralized management of the Office of the Secretary of Defense, is charged with pursuing technologies for defense against ballistic missiles. The Army Ballistic Missile Defense (BMD) Program has received renewed interest and increased emphasis within the developing program and will play a key role in achieving the President's goal.

After the Congressionally directed termination of the Army-developed BMD SAFEGUARD system in 1976, the U.S. has not had a deployed BMD system. However, a continuing R&D program in BMD technology development and functional demonstrations has evolved. It promises new technologies and refined system concepts to provide reduced risk, and technically advanced options for future full-scale development. The potential for highly effective defensive systems has never been greater. New systems concepts possess potential for counter-attacking strategic ballistic missiles in all phases of their trajectories. Progress has been equally dramatic in expanding and advancing the technology base from which these future BMD systems will evolve. As a result, the program is in a position to make substantial contributions to the Strategic Defense Initiative technology efforts.

The Army BMD program has been conducting R&D aimed at increasing the capabilities and effectiveness of defensive systems for over 25 years. Because of these efforts, the Army has a highly experienced BMD organization and an extensive technical data base. The Army is therefore uniquely capable of supporting the Strategic Defense Initiative through early functional technology demonstrations of defense capabilities.

Major program thrusts are aimed at demonstrating system and subsystem concepts, and developing the mature technologies necessary to support them. Significant effort will be put into defense definition, demonstrations of aircraft optical adjuncts, terminal imaging radar, advanced radar discrimination, and nonnuclear kill interceptors. Nonnuclear Kill (NNK) mechanisms both within the atmosphere (Endoatmospheric NNK) and outside the earth's atmosphere (Exoatmospheric NNK) are major elements of the program. The recent Homing Overlay Experiment (HOE) very dramatically demonstrated the feasibility of Exoatmospheric NNK. In addition, advanced development will proceed on a terminal imaging radar, and data processor, and a command, control, communications/battle management (C^3/BM) system. Advanced technology work, to expand the base from which new systems will evolve, will continue on a broad front, including research on directed energy and kinetic energy weapon technologies, advanced sensors, battle management, data processing, and discrimination missiles.

The integration of these defense options into a multi-tiered in-depth defense provides a logical and evolutionary growth path for BMD to a wide range of future options to counter a continued buildup in both quantity and quality of the Soviet threat. These options provide the flexibility required for the various potential BMD missions. For example, a defense in depth or some revolutionary concept could provide protection to critical military and industrial installations and other high value targets.

The BMD program also operates the Kwajalein Missile Range (KMR) as a national range. The simultaneous use of KMR for both strategic offensive and defensive program testing provides a unique opportunity to collect realistic data vital to both efforts. The ability of the BMD program to observe and analyze development and operational ICBM firings allows cost savings in the tens of millions of dollars yearly. Kwajalein is the only range in the free world that can accommodate full-scale ICBM tests and provide sophisticated data collection for the terminal and midcourse portions of the trajectory. The KMR is a unique national resource, utilized by the Services, NASA, and other government agencies.

The Compact of Free Association (the Compact) was drafted by the United States, and by the Federated States of Micronesia (FSM) and the Republic of the Marshall Islands (RMI) on 1 October 1982 and 25 June 1983, respectively. It was approved in UN-observed plebiscites by FSM and RMI on 21 June 1983 and 7 September 1983, respectively. The President asked the Congress to enact a joint resolution approving the Compact between the U.S., the FSM and RMI on 30 March 1984. Early approval of the Compact by Congress will ensure continued use of the Kwajalein Missile Range, a national range of vital U.S. strategic interest for the next 30 years.

The Army BMD program, through its broadly-based R&D efforts, seeks to develop multi-tiered defense capabilities and conduct early demonstrations of critical defense components. The development of nonnuclear kill systems will continue to receive high priority. The BMD program, by building on the existing infrastructure and emphasizing evolutionary development, is able to accomplish these goals and offer a wide range of options for the defense of the country.

CLOSE COMBAT

The Close Combat mission area relates to weapons and equipment which are used to bring direct, line-of-sight fire upon the enemy. The soldiers who fill this role are often referred to as "frontline troops" and their job is to close with and destroy the enemy. To do so, they must be well led, well trained, and provided with the equipment that will give them an edge over their adversaries. The next several paragraphs will describe those close combat equipment systems for which we are requesting funds in the FY86 budget.

The main offensive and defensive ground weapon of both the US and Soviet ground armies is the tank. In a combined arms role, tanks can dominate the battlefield, spearheading the offensive, killing other tanks, devastating "soft" targets, and driving through defensive positions with massive momentum. Equally adept on the defensive, the tank provides a ground commander with unequalled capability to counter enemy offensive ground weapon systems. The tank is essential to success on the modern battlefield. The Army's main battle tank, the Abrams, is the most powerful, mobile, and survivable combat vehicle we have ever fielded, and we believe that it can outperform any other tank on the battlefield.

M1 Abrams

Shooting-On-The-Move

The agility of a tank is a major element in determining its effectiveness and survivability on the battlefield. A 1500-horsepower turbine engine supplies the Abrams with double the power of its diesel-powered predecessor, the M60. Coupled with an improved suspension system, its agility is unsurpassed by any tank in the world today. Its stabilized sighting system ensures that speed is combined with accurate firepower. Tankers are able to routinely hit 5-foot targets over a mile away while moving rapidly cross-country. This kind of shoot-on-the-move accuracy is made possible by design features of the fire control and improved suspension systems. The gunner puts his sight on the target and finds the range using a laser rangefinder; a computer automatically determines the ballistic data and adjusts the lay of the main gun; the gunner need only squeeze the trigger to hit the target.

The future battlefield will be thick with antitank weapons. Therefore, the Abrams is protected by advanced armor. This, plus its low silhouette and agility, increases its survivability on the battlefield. If the tank is penetrated, a number of revolutionary safety features greatly enhance the survivability of the crew and the vehicle. These include an automatic fire detection and extinguishing system and armored compartments that separate the fuel tanks and main gun ammunition from the crew. The Abrams' passive thermal imaging system allows location of targets at night and through dust, haze, fog, and smoke without disclosing the tank's position.

The main armament of the currently fielded M1 is a 105mm rifled gun that fires chemical energy and improved kinetic energy rounds. Programs are underway to enhance the effectiveness of both gun and ammunition to defeat the anticipated threat. In addition, beginning in 1985 the Abrams will incorporate the German-designed, US-manufactured 120mm smoothbore gun, improved NBC protection system and improved armor. This new version of the M1 is designated the M1A1. The addition of the 120mm gun will insure that US tanks can keep pace with improvements in Soviet armor expected in the late 1980's and beyond. The major advantages of the 120mm gun system are greater kill capability and growth potential to meet advanced armor threats.

A proven performer

Design criteria make interesting reading, but the real proof comes during operations by soldiers. The first three M1 battalions fielded in Germany participated in field exercise REFORGER 1982. The M1's performance was superb. LTG Mahaffey, then Commander of the 3d Mechanized Infantry Division in Europe, commenting on the M1's superior speed, mobility and fire-on-the-move capability said, "... I am now convinced we are on the threshold of a whole new dimension of battlefield combat capability." Recently, as reported by General Otis, Commander of U. S. Army, Europe, results from REFORGER 83 verified the operational capability, reliability and logistics supportability of the M1 in a realistic and fast moving combat scenario. Again, the durability and reliability was demonstrated as the 53 M1's of the 1st Squadron, 11th Armored Cavalry Regiment, achieved a 98 percent mission capable rate for the entire eleven day exercise.

REFORGER 1984 saw the largest concentration to date of M1's in a battlefield exercise. The 282 tanks engaged represented the 3rd Infantry Division, 2nd Armored Division and 2nd Armored Cavalry Regiment. This combined force achieved a mission capable rate of 96 percent.

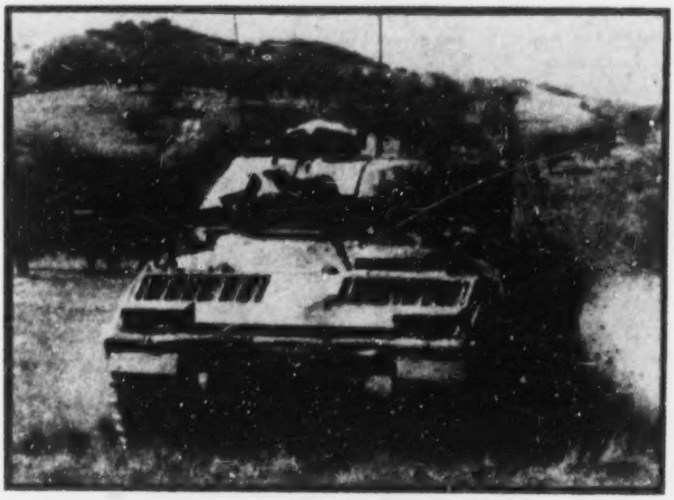
The soldiers' appraisal of the M1 can be summed up in one word--winner! They found the M1 Abrams easier to maintain than the M60 tank and able to shoot more accurately while moving cross-country at high speed.

The Army has fielded six battalions at Fort Hood, Texas, and six M1 battalions and five Armored Cavalry Squadrons in Germany. A North Carolina National Guard Armored Battalion (a 2d Armored Division round-out battalion) has received its tanks underscoring our commitment to modernize the reserve components. The FY86 budget provides for 840 M1A1 Abrams Tanks. We have produced 2,353 M1 tanks as of 31 December 1984.

M60A3

The M60A3, a product improved M60 tank, when employed in coordination with the M1 provides a formidable tank force. The M60A3 is a quality tank that will continue to see service into the 1990's because we cannot afford to replace our entire fleet of M60 series tanks with the Abrams. We will continue to upgrade older model M60 series tanks to the M60A3 configuration. The M60A3 model incorporates a laser rangefinder and a ballistic computer for accurate ranging and improved fire control solutions, and a thermal sight that gives the crew an improved capability to detect targets in darkness and on an obscured battlefield. In FY86, 460 conversion kits will be procured.

The history of modern warfare has vividly demonstrated that armored vehicles are critical to success on the battlefield. Operating independently, however, they are vulnerable to antitank fires from enemy infantry. Therefore, mechanized infantry must be combined with armor to assure a blend of maneuver forces that will provide the flexibility necessary to defeat any threat. The Bradley Fighting Vehicle is an ideal partner for the Abrams. This vehicle has two configurations, the Infantry Fighting Vehicle (IFV) and the Cavalry Fighting Vehicle (CFV).



Bradley Fighting Vehicle

The Bradley Fighting Vehicle provides vastly improved cross-country mobility, firepower, and armored protection to the mechanized infantry squad. In intense combat situations, the tank-infantry force must be supported on the move by continuous and accurate fire. The primary weapon of the IFV is a stabilized, dual-fed 25mm automatic cannon. The commander or gunner can instantly select either high-explosive or armor-piercing rounds. The high-explosive round can destroy unarmored ground targets out to 2500 meters, while the armor-piercing rounds are capable of penetrating and defeating the Soviet BMP. The two-man turret also has a two-tube TOW missile launcher and a 7.62mm coaxial machinegun. The TOW gives each squad the capability to engage enemy tanks at long range from overwatch (protected) positions.

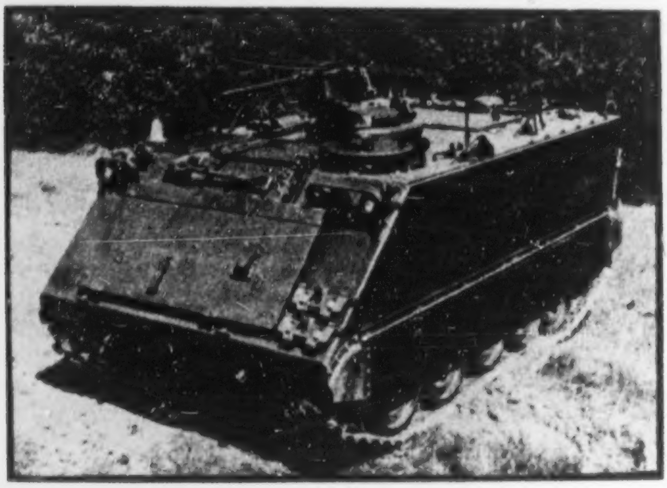
The IFV has vision blocks, through which each member of the squad it transports can view the battlefield and direct fire from their modified M-16 rifles through individual firing ports. This permits continuous observation of, and contact with, the enemy while on the move. Once outside the vehicle, troops can move toward the objective supported by a high volume of firepower from the vehicle's other weapons.

The CFV is identical to the IFV except for minor modifications for crew size and equipment. The CFV carries a five-man scout squad and provides the cross-country mobility and mounted firepower necessary for armored cavalry and battalion scout squads to carry out reconnaissance, security, and economy-of-force operations.

M2-3 Bradley Fighting Vehicle

Both the IFV and CFV have an inherent swimming capability and are air transportable in either the C-141 or C-5A aircraft. These fighting vehicles match the highway and cross-country mobility of the Abrams tank. Furthermore, they provide soldiers significant protection from enemy small caliber weapons, artillery airbursts and antipersonnel mines. A thermal night sight insures that this potent weapon system maintains its capability during night operations. No fighting vehicle available in the world today matches the all-around capabilities provided by the Bradley.

The first Bradley production vehicle was delivered to the Army in May 1981. Today, we are producing the Bradley at a rate of 50 vehicles per month. The first mechanized infantry battalion was equipped in March 1983 at Fort Hood, Texas, and the first European battalion was equipped in September 1983. The North Carolina National Guard has also received six CFV's. As of 1 January 1985, 1485 Bradleys have been accepted by the Army. Ten battalions have been fielded, including the 2d Armored Division in the U.S. and two brigades of the 3d Infantry Division in Europe. The FY86 budget supports the production of 716 Bradley vehicles in the BFVS-A1 configuration. This vehicle includes the TOW-2 system, a tank killing armament, which allows the Bradley to shoot through obscurants while counteracting jamming.



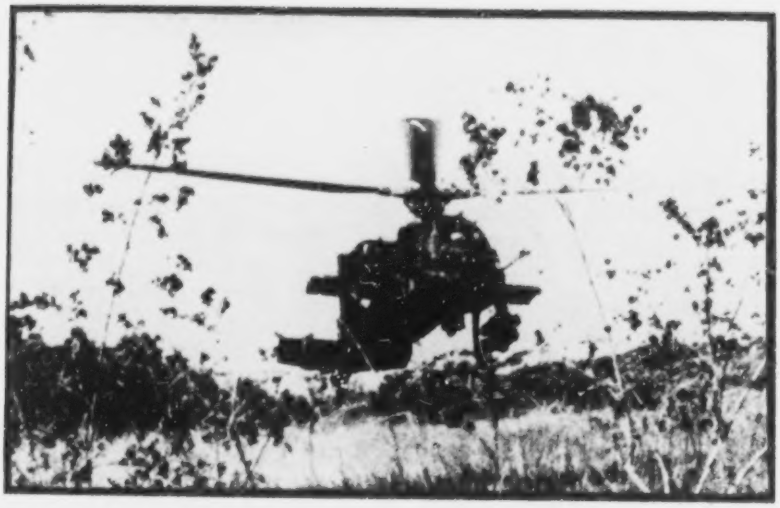
M113 Armored Personnel Carrier

The M113 family of vehicles continues to serve the Army in a variety of combat, combat support, and combat service support roles. The Army has begun survivability modifications to enhance the capability of this fleet into the 1990's. Improvements include spall suppression liners which decrease the spray of shrapnel in the event of vehicle penetration. Additional improvements are armored external fuel tanks, improvements to the power train and provisions for add-on armor kits to increase protection levels for the crew. The powertrain improvements increase reliability and maintainability while providing the power increase needed to assure adequate agility and mobility on the battlefield. The FY86 carrier procurement supports the purchase of 315 improved vehicles.

Another variant of the M113 vehicle family is the M577 Command Post Vehicle which provides command and control facilities for both forward maneuver and support forces. It features a raised top deck section that permits stand-up work within the carrier and an auxillary power unit to permit operation with the main engine shut down. In 1986, the Army plans to procure 115 new M577's against existing shortages.

Attack helicopters continue to be a key element of our Army's combat capability. They provide our forces with a highly mobile, long range, day/night lethal antiarmor fire capability, coupled with the anti-materiel, antipersonnel effect of cannon and 2.75-inch rockets. The attack helicopter was first used in combat in Southeast Asia where it proved to be a great asset to light infantry forces.

Because of its inherent mobility, attack helicopters will play a major role in any situation that requires our forces to react quickly. They can strategically deploy to reinforce Europe or respond to other contingency requirements; they can fly rapidly across a wide front to areas that cannot be reached easily by ground mobile forces and they provide a significant advantage in target-rich environments where exploitation is feasible. In Europe, a ground attack on our forces will be spearheaded by masses of armored vehicles. Soviet doctrine stresses building overwhelming momentum with blitzkrieg-like tactics. Frontages mandate that we concentrate on their main avenue of approach and quickly counter their armored thrusts. No other weapon system offers the combination of high movement rates, freedom of the tyranny of terrain, and long-range point target destruction capability, around the clock, even during adverse weather conditions like that of the attack helicopter.



AH64 Attack Helicopter

The large number of attack helicopters that the Soviets have fielded in recent years shows that their leaders share our belief that the attack helicopter will play a vital role in any future land battle. The importance of attack helicopters, and the recognition of Cobra/TOW performance limitations, led to the development and procurement of the Apache Attack Helicopter (AH-64). The Apache represents a significant increase in performance, firepower, and survivability when compared with its predecessor--the AH-1S Cobra. More important, the Apache provides the Army a mobile, lethal antitank capability that can be quickly deployed worldwide to areas of strategic concern well in advance of heavier antitank systems. Apache's ability to operate worldwide over a broad spectrum of environments may be the difference between success or failure.

The powerful, two-engine Apache has been designed from the start to perform anywhere in the world under the most demanding conditions of altitude and climate. Its agility enables pilots to take advantage of the terrain, vegetation, and even buildings to avoid detection. A target acquisition/designation sight (TADS) and pilot night vision sensor (PNVS) enable the crew to navigate and attack in darkness, bad weather and on an obscured battlefield.

Apache carries a formidable array of weaponry. The main armament is the Hellfire, a third-generation antiarmor

Apache with Hellfire

missile. Apache's other armament includes the 30mm chain gun and Hydra 70 multi-purpose submunition rockets, which are lethal against a wide variety of targets and complement the antiarmor Hellfire missiles.

The Apache's performance characteristics, coupled with survivability features such as armor protection, redundant controls, and electronic countermeasures equipment, make it one of the most survivable systems on the battlefield. A total of 18 Apaches have been delivered to the Army as of 31 January 1985. Training of pilots and maintenance personnel is underway to support fielding of the first Apache unit during the spring of 1986. The FY86 budget provides for procurement of 144 Apache helicopters at the economic rate of 12 per month, and a fifth buy of Hellfire missiles.

Like the M60 series tank, the AH-1 Cobra helicopter has been continually upgraded to improve its operational capabilities, safety, and survivability. While these improvements will contribute to its effectiveness and survivability against armor, the Cobra is currently a daytime helicopter with limited aircraft performance capability when operating in a characteristically hot Middle Eastern environment.

AH-1S Cobra/TOW

To correct the night-fighting shortfall, some Cobras will be modified with a Forward-Looking Infrared System (FLIR) to provide a night target engagement capability. The FY86 budget also funds other improvements and continues the Cobra Fleet Life Extension (C-FLEX) program. The C-FLEX program will enable the Cobra to continue in use beyond the year 2000.

The use of scout helicopters to seek and select targets enables attack helicopters to conserve fuel and ordnance, and allows the commander to concentrate his antitank capability at critical points. Upon acquiring targets, the scouts position the attack helicopters, determine the distribution of fires, laser designate targets for the Hellfire missile, and coordinate artillery fires throughout the battle area. During the battle, scouts provide real-time battlefield information relating to the enemy situation and targets destroyed. Additionally, the scout is a responsive system to refine intelligence from other sources and integrate all forms of firepower against the target.

The Army does not currently have a scout helicopter that satisfactorily performs this integrated mission with the attack helicopter or the field artillery. The Army Helicopter Improvement Program (AHIP) will upgrade part of the scout fleet into an improved scout helicopter to partially fill this need. Engine performance and rotor improvements will make the AHIP better able to operate on hot days and at high altitude. A mast-mounted sight will incorporate a laser designator and a forward looking, infrared capability for night and adverse weather operations. This mast mounted sight allows the helicopter to remain masked behind the terrain with only the sight exposed. In addition to working with attack helicopters equipped with Hellfire missiles, the Scout will have the capability to acquire and designate targets for Copperhead and other Army or Air Force precision guided munitions.

Army Helicopter Improvement Program

The AHIP program, based upon modification of an existing light observation aircraft, complies with Congressional guidance and shows significant savings when compared with a new airframe development program. The FY85 budget supported completion of full-scale development and operational testing, of five AHIP prototypes, initiated in FY84. These test results were good. Advanced procurement funding in FY85 and procurement funds in FY86 will provide for the conversion of 56 aircraft in FY86. Advanced procurement funding in FY86 and procurement funds in FY87 will provide for the conversion of 60 aircraft in FY87.

In Vietnam and Korea, the helicopter proved its worth as a combat multiplier. UH-1's, COBRAs and Light

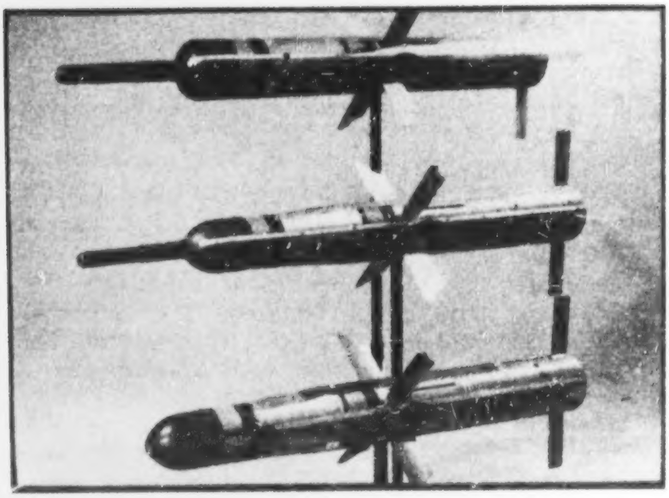
Observation Helicopters (LOHs) fought alongside tank, infantry and artillery to become an integral member of the combined arms team. Those same 1960 and 1970 helicopters are getting old and can't keep pace with expanded commitments and tactical requirements. By the mid-1990s, this Army helicopter fleet will be nearly 30 years old. To replace many of these systems the Army will develop a family of Light Helicopters (LHX). These aircraft will be small, lightweight rotorcraft, easily maintained and highly reliable. Their crew, weapons and sensors will be fully integrated using advanced technology for maximum lethality and they will be capable of fighting anytime, anywhere in the world, in nearly all weather conditions.

To make it small and lightweight, LHX will incorporate composite structures (saving approximately 25 percent of a comparable metal aircraft weight), use advanced technology, fuel-efficient engines and incorporate fiber optic flight controls weighing substantially less than those using current technology. In addition, LHX will have enhanced survivability through full NBC protective features and extensive crashworthiness integral to design.

In FY85 we will continue our research into the concept of single pilot operations for LHX. We will continue LHX preliminary design studies to focus on its detailed configuration and continue full scale development on the LHX advanced technology engine (T800).

The Hellfire missile, described earlier as the primary weapon system of the Apache, warrants more discussion. It is a laser-guided missile capable of employment both in direct and indirect fire modes. Hellfire is faster, has longer range, and has greater killing power than the TOW. Targets can be laser-designated for the Hellfire seeker by its own launch aircraft, another attack or improved scout helicopter, or by a ground laser designator in the hands of armor, infantry, or artillery elements. This flexibility will keep the enemy guessing and limit his ability to counter the missile. The Hellfire's contribution to our combat resources makes its fielding a top priority among force modernization efforts for which we are requesting funds.

The TOW missile system, which is found on the AH-1S Cobra, the Bradley Vehicles, Improved TOW Vehicles, and with the dismounted infantry, is the most powerful antitank weapon used by ground units. This long-range (3750 meters) antiarmor system is a prime example of evolutionary development. First fielded in the late 1960's, the TOW has been improved to keep pace with the evolving Soviet tank



TOW-2 Improved TOW,
Basic TOW (Top to Bottom)

threat. The latest improvement, designated TOW 2, will give the weapon an even more lethal 6-inch warhead, greater speed to reduce vulnerability, and improved guidance for an obscured battlefield environment. Deliveries of TOW 2 began in 1983 and it was deployed to Europe in October 1984. Deliveries are now being made to Far East units. FY86 funds will be used to procure TOW 2 missiles and launcher modifications.

A close-in, final protective weapon is vital to the survival of defending forces when faced by an enemy in close combat. The Lightweight Multi-purpose Anti-materiel Weapon (LAW) was designed to provide the capability required in these critical situations.

During the past two years the Army and Marine Corps conducted evaluations of all available weapons of this type. The results of these evaluations led the Army to cancel Viper as too expensive. The Army is developing an improved M72E4 for this mission, and also continues to test the Swedish AT-4 as a possible complement to the M72.

This type of lightweight weapon provides small dispersed units with a lightweight suppressive capability against a wide variety of targets. It can be employed throughout the depth of the battlefield to engage crew-served weapons, lightly armored and reconnaissance vehicles, antiaircraft guns, and trucks, as well as side or rear shots at tanks. It is well-suited for engaging fortified positions or for use in built-up areas, and is ideal for use in combat patrols such as those conducted by our infantry and ranger units.

Squad Automatic Weapon

The Squad Automatic Weapon (SAW) is a lightweight, manportable weapon capable of delivering a heavy volume of effective fire up to a range of 800 meters. It provides increased range, volume of fire, and better penetration than the M16A1 rifle which it replaces as the squad automatic weapon. The fielding of this weapon will provide a significant increase in overall squad firepower.

The mortar, although an indirect fire weapon, is included in the close combat mission area since it is used by forward combat units. The Army will replace the present 81mm mortars with an improved 81mm mortar which incorporates a British manufactured mortar barrel and bipod mount and a US base plate and sight. It will fire an improved high-explosive round that will accommodate a multioption fuze and achieve extended range, increased accuracy, and higher lethality. Improved smoke and illumination projectiles are also under development. The FY86 request is for $6.1 million to purchase 187 systems. The Army will also replace the aged 4.2 inch mortars with the 120mm mortar. The 120mm mortars will be at the battalion level in mechanized, armored and motorized divisions. Fielding is expected to begin in either late FY85 or early FY86.

The Mark 19 Mod 3, 40mm automatic grenade launcher fires antipersonnel and anti-light-armor grenades to a maximum effective range of 1650 meters. The MK19-3 will be used in the main battle area by all types of infantry units, and by combat support and combat service support units to conduct rear area security missions. It replaces selected M2 (.50 caliber) and M60 (7.62mm) machineguns and will be mounted on ground mounts and on Army vehicles such as the High Mobility Multi-purpose Wheeled Vehicle (HMMWV) and the Fast Attack Vehicle (FAV). The FY86 request is for $9.0 million to procure 821 systems.

Nightfall will no longer curtail battle activities. Because of advanced night vision devices, night will simply mean a slightly altered environment to soldiers in a future war. This is possible through the Army's use of two different types of night vision equipment: image intensifiers and forward looking infrared imagers. The latter is also referred to as "FLIR" or "thermal imaging".

Image intensifiers see in darkness by amplifying the dim starlight and moonlight reflected from an object. The image intensification devices are lightweight and provide excellent resolution while "seeing" in the dark. These devices are for the individual soldier as well as the wheeled and tracked combat vehicle. The AN/AVS-6 and AN/PVS-5 are night vision goggles for aviators and ground soldiers. The night vision device for the M16 and M60 machinegun is the AN/PVS-4 and the AN/TVS-5 is designed for the M2 (.50 cal) machinegun. The AN/VVS-2, Drivers Viewer, gives the tracked vehicle driver a greater mobility capability, while driving at night.

Another family of night vision devices is thermal imaging. By sensing the temperature difference between an object and its surroundings, these devices allow the soldier to "see" through darkness, smoke, haze, fog, and battlefield obscurants to recognize and identify targets. The Army systems incorporating thermal technology include a family of manportable systems consisting of the AN/TAS-4A, TOW Night Sight; AN/TAS-5, Dragon Night Tracker; and AN/TAS-6, Night Observation Device Long Range (NODLR). The M60A3 and M1 tanks incorporate the AN/VSG-2 and TIS, respectively, for gunner and commander use. The AH-64 APACHE attack helicopter uses the TADS/PNVS for fire control and pilot's night vision.

The Army's technology in night vision devices clearly leads that of Warsaw Pact Nations; however, the gap is closing. Therefore, we must continue technology efforts towards developing newer generation devices so that we can use darkness to our advantage on the future battlefield.

The next section on fire support mission area discusses how those frontline soldiers are supported.

FIRE SUPPORT

The Fire Support mission area includes those systems that are used to generate indirect firepower. The systems in this mission area include not only conventional, nuclear, and chemical firepower provided by cannons, rockets, and missile systems, but also the target acquisition and fire control elements integral to field artillery systems. This section will address the Army's longest range systems first and then will discuss direct support artillery weapons, fire control, target acquisition systems, and finally ammunition developments.

Soviet doctrine emphasizes the use of echelonment in depth. Warsaw Pact forces attack with successive waves of forces, massing as necessary through the use of mechanized armament systems to achieve victory. We must, therefore, be able to strike early and strike deep with great accuracy and massive firepower. We must also be capable of attacking enemy units up to the forward edge of our own troop positions with concentrated, accurate, and readily available firepower.

The Soviets' early use of their own artillery will make this task even more difficult. Their doctrine stresses the use of concentrated artillery fire in coordination with blitzkrieg-like manuever of troops. The Soviets greatly outnumber us in artillery and have the potential to strike our positions with massive amounts of indirect fires. To preclude this, our own field artillery must be able to neutralize their indirect fire systems through effective counterfire.

Pershing II

The Army's most powerful weapon is the Pershing II, which has more than twice the range of the existing Pershing Ia and far better accuracy. It employs radar area correlation to achieve its pinpoint accuracy. Radar "pictures" of the target area, in cassette form, are inserted into the missile prior to launch. As the reentry vehicle approaches the general target area, it takes its own radar "pictures" of the terrain, comparing them to the original. By making course corrections until the two pictures coincide, the missile can achieve surgical accuracy. This permits the use of a relatively small nuclear warhead that reduces collateral damage to the minimum. Pershing II is in production and began deployment in December 1983. FY86 funds will support the fifth production buy.

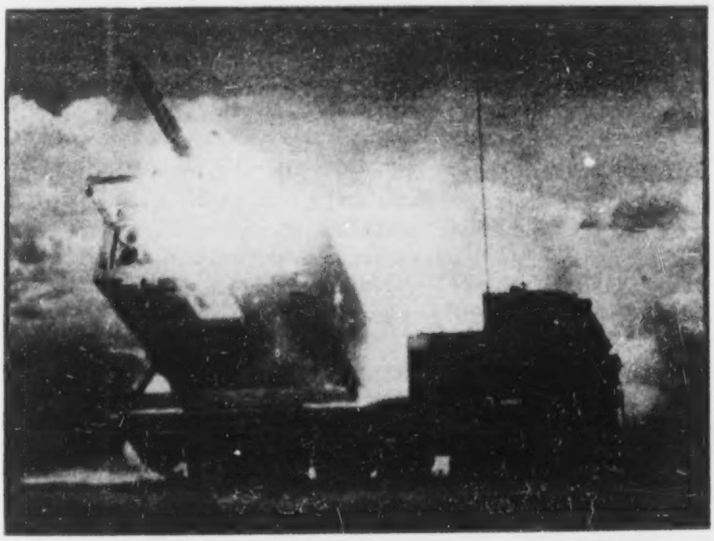
The Lance missile system, which was fielded in the mid-1970's, is our current system used to attack second-echelon enemy formations and for delivery of short-to medium-range nuclear fires. Lance can deliver a 1000 pound conventional warhead to a target located over 70 kilometers away. Enemy logistics facilities, air defense sites, and communications centers are prime targets for this warhead.

To improve the conventional capability provided by Lance and to eliminate many of it's shortcomings (e.g., slow rate of fire, manpower intensity, limited range, etc.), a follow-on joint program with the Air Force, called the Joint Tactical Missile System (JTACMS), is being pursued for the late 1980's/early 1990's.

JTACMS-Army will be used by the corps commander to destroy, delay, or neutralize enemy forces far beyond the range of cannons and rockets. The corps, by slowing down the enemy's ability to reinforce and support the central battle, can overcome the expected unfavorable force ratio. In November 1984, the Army and Air Force agreed in a Joint Statement of Need (JSON) that JTACMS "will be a family of complementary weapons developed by the two services to hold at risk and engage targets in the deep battle area". JTACMS-Army is a ballistic missile that is the Army component of the JTACMS family. FY86 funds provide for a continuing development program to lead us to the earliest possible IOC.

The Army-led, Joint Antitactical Missile (ATM) program began in FY 83 to develop counters for the growing tactical surface-to-surface missile threat. The program consists of concurrent, near-term, and long-term approaches that solve counterforce and terminal defense problems. Near-term efforts upgrade existing air defense systems to field an early terminal defense capability. Longer term efforts focus on development of a counterforce sensor, engagement and destruction system. The full solution will include both active and passive countermeasures, and should require a combination of systems, such as JTACMS-Army and current Army air defense systems. FY86 funds will provide for continued early research and development work in threat vulnerability and counterforce requirements.

While we must be prepared for both nuclear and nonnuclear contingencies, our first response capability must be adequate conventional firepower. As enemy units advance, there may be critical periods when large numbers of targets threaten to overwhelm the capacity of tube artillery. When this happens, we must be able to strike deep with great accuracy and massive firepower, as well as be capable of attacking enemy units up to the forward edge of our troop positions with concentrated, responsive fire.

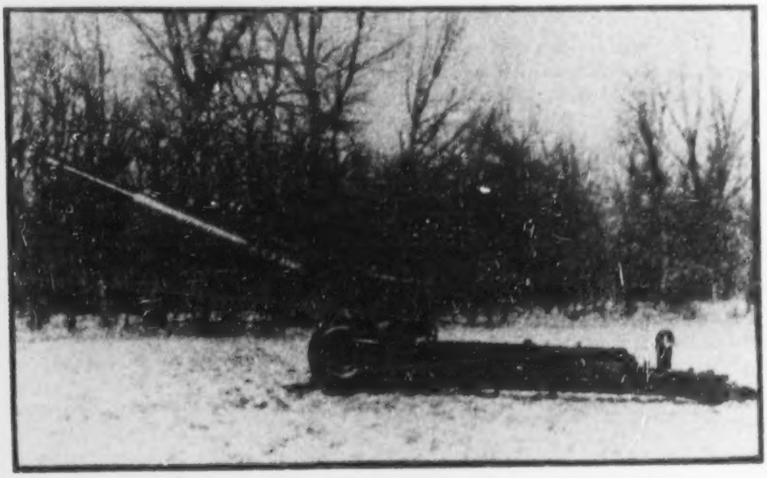


Multiple Launch Rocket System

The Multiple Launch Rocket System (MLRS) is the system that fills this need. It provides the Army with its first multiple rocket artillery capability since World War II. The MLRS rocket warheads contain a large number of improved conventional submunitions which are dispensed from the rocket high over the target and blanket the area with explosives and fragments. These submunitions are devastating against targets such as air defense sites, artillery positions, and troops in the open. The submunitions are also effective against the thin top armor of tanks and other fighting vehicles. The MLRS will be used against concentrations of enemy vehicles, enemy artillery, and as an air defense suppression means.

The system also has incorporated a number of built-in efficiencies. The rockets are sealed in pods for shipment and require no maintenance after leaving the factory. The MLRS tracked carrier vehicle is a derivative of the Bradley Fighting Vehicle and has the same power train and level of armor protection for the crew's protection. Although normally operated by a three-man crew, in an emergency one soldier can operate the entire system. Devices on the launcher can determine both location and direction, and an on-board computer unit computes fire commands, sets fuzes, and automatically fires the rockets. The vehicle cab is designed so that crew-members can remain in the cab during rocket firing. It also has a positive overpressure system to protect the crew in the cab from exhaust gases during launch. The FY86 Budget is for continuation of the fourth year of a five year multiyear contract of this important new system.

The MLRS was developed by the US in cooperation with Germany, France, the United Kingdom, and Italy. In conjunction with Germany, France, and the United Kingdom, we are pursuing the development of Terminal Guidance Warhead (TGW) submunitions. These submunitions will enable the MLRS to attack hard point targets in excess of 30 kilometers from the launcher. The concept calls for a rocket to fly to the kill zone, where the warhead will dispense multiple submunitions that seek out and destroy enemy targets. The FY86 budget will provide the continued funding for TGW component development and demonstration.



M198 Howitzer

The M198, 155mm Towed Howitzer, is the general support artillery for the non-mechanized divisions. It is also our newest howitzer. It is capable of firing 30 kilometers using a rocket-assisted projectile. The M198 provides major increases in range and reliability over its predecessors and may be delivered by parachute or carried by a variety of cargo aircraft and the CH-47 helicopter. The M198 can fire scatterable mines, nuclear rounds, improved conventional munitions (ICM's), conventional high explosives, and Copperhead. Although our budget does not contain M198 procurement funds for this fiscal year, our long-range plan forecasts additional procurements beginning in FY87 and continuing through FY89.

M109 Howitzer Improvment Program

The mechanized and armored portions of our force structure have the M109 self-propelled 155mm howitzer and the M110 8-inch self-propelled howitzer. These weapons date back to the 1960's, but have been improved over the intervening years. We have extended the range of the 155mm howitzer to 24 kilometers and the range of the 8-inch howitzer to 30 kilometers using rocket-assisted projectiles. We are continuing to modify the M109 in order to extend the life of the system to at least the year 2000. In this year's budget request we have asked for $25.44 million to procure modification kits that will provide increases in survivability, automotive reliability and maintainability. We are also conducting research and development of improvements that will provide additional increases in armament reliability and survivability against NBC attack and counterfire, as well as increased responsiveness and reduced crew fatigue. The howitzer improvements are only part of the overall effort leading to modernization of the Artillery System.

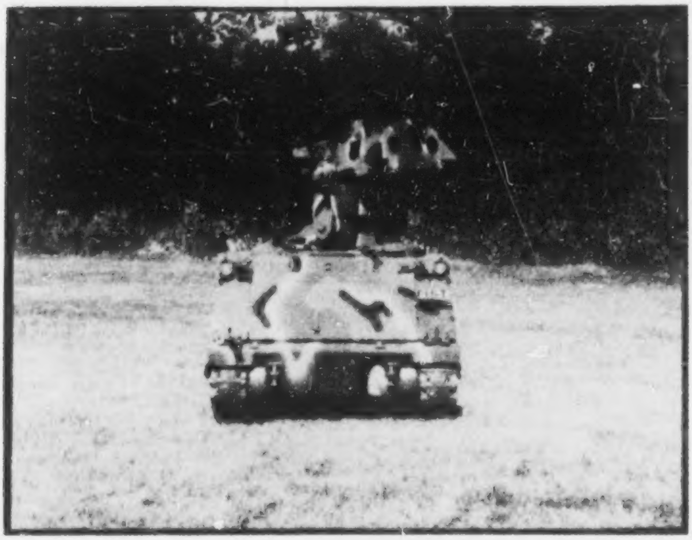
G/VLLD

The Ground/Vehicle Laser Locator Designator (G/VLLD) is used by artillery forward observers. This dual-purpose device is used by a forward observer to determine target ranges precisely and to designate targets for laser-guided projectiles, missiles, or bombs. The G/VLLD achieved its initial operational capability in 1982. The FY86 budget provides for continued procurement.

In our armored and mechanized units the Fire Support Team (FIST) requires a mounted vehicular capability. The new Fire Support Team Vehicle (FISTV) will give the FIST armor protection, mobility, and built-in communications which will enable it to operate with fast-moving armor, mechanized infantry, and cavalry units, and be responsive to the maneuver commander.

The FISTV represents a combination of new laser improved artillery observer equipment with the proven performance of the M113A2 personnel carrier. The vehicle is very similar in appearance to the Improved TOW Vehicle and incorporates the G/VLLD in an armored, elevated module mounted on an M113A2 chassis. The FISTV is equipped with a north-seeking gyro that provides the directional data needed for accurate artillery fire requests. It can operate in hull defilade with only the elevated G/VLLD module exposed, thereby increasing survivability. The FY86 funding provides for continued procurement of FISTV Modification Kits. The Army plans to convert 205 M113's to FISTV's this year. The first vehicles will be fielded to the 24th Infantry Division in 1985.

The effective management of the enhanced capability we have been describing is an important responsibility of the Field Artillery. Specifically, our artillerymen have the "fire support mission" for the collective employment of mortars, field artillery, air support, naval gunfire, and other lethal and non-lethal (smoke, illumination) attack systems in support of combat operations. To accomplish this mission, fully automated support for planning, coordination, control, and execution of close support, counterfire, interdiction, and air suppression fires is required to maximize our combat power.



Fire Support Team Vehicle (FISTV)

Our Field Artillery Tactical Fire Direction System (TACFIRE), as currently fielded, represents first generation technology that provides automated data processing of technical fire control data, selection of munitions and volume of fire for enhanced target accuracy. However, the requirements for a total fire support package that provides (1) development of targets and delivery of fires; (2) coordination and control of fires and fire support assets; and (3) planning for future operations represent severe limitations for TACFIRE on tomorrow's battlefield. In essence, TACFIRE will not meet the data processing needs of the fire support system for the 1990's and beyond. It also isn't economically smart to produce TACFIRE spare parts by mid 1990 because of outdated technology.

TACFIRE's replacement, "The Advanced Field Artillery Tactical Data System (AFATDS) will significantly broaden and modernize the US Army fire support command, control, and coordination systems. The AFATDS will expand the TACFIRE capabilities with no increase in personnel requirements and will provide automated support for the Fire Support Control Segment of the Army Command and Control System (ACCS) during the 1990-2010 timeframe. Compatibility and interoperability will be provided with all existing and planned US Army Field Artillery Systems to include sensor systems, related NATO systems from the United Kingdom (BATES) and the Federal Republic of Germany (ALDER), the Marine Integrated Fire and Air Support System (MIFASS), and other Functional Control Segment Systems in the ACCS architecture.

The AFATDS will retain selected systems of the present TACFIRE for total system integration. For example, the related technical system which provides firing data to each individual weapon will be retained. The Fire Support Team and Forward Observer Digital Message Device (DMD and FIST DMD) will continue to be the "forward entry devices" in AFATDS and are "not" part of the AFATDS funding program.

Lastly, AFATDS represents the Army's first automated program that is truly "software driven". Specifically, prior to any hardware consideration, user requirements must be accurately defined and then translated, through software development, into a DOD higher order level language (Ada). Once the user software is written, then the hardware will be selected. This approach ensures users satisfaction; it maximizes detailed functional definition of the fire support, command control and coordination requirement; it instills a market survey for procuring hardware components that is driven by the user requirement - the software development program. Target acquisition within the fire support mission area is of equal importance to fire delivery and control systems. The Firefinder system, consisting of AN/TPQ-36 mortar-locating radar and AN/TPQ-37 artillery-locating radar, provides our soldiers the ability to automatically detect and locate enemy batteries in realtime and to attack them with timely and accurate counterbattery fire. The final procurement request for Firefinder was FY83, with the last unit scheduled for delivery to the Army from that buy in late 1985.

The effective use of field artillery weapons depends upon accurate location, direction, and estimates of the influence of the atmosphere on artillery projectiles, rockets, and missiles as they travel to their targets. We now have automated systems to provide these data.

The Position and Azimuth Determining System (PADS) is an automated, self-contained inertial surveying system which provides the field artillery with a secure, all-weather, day/night means for rapid survey control. Surveys that normally take the conventional five-man survey party 12 hours can now be accomplished by a two-man PADS party in less than two hours. The FY86 request will purchase 97 systems which will add to the 307 systems already procured.

The new Meteorological Data System (MDS) will insure that artillery fires are corrected for changing atmospheric conditions. This is significant since greater ranges of artillery projectiles will cause them to be exposed to atmospheric effects for increased periods of time. Reliable data are also required on how weather will affect electronic warfare and battlefield obscurants employed by the enemy. In a "dirty battlefield" environment, where anything from a severe storm to chemical or nuclear conditions may prevail, we must have timely meteorological data. The MDS will accurately measure the atmospheric variations and automatically transmit those variations to TACFIRE and other automated systems that compute artillery firing commands.

Our ammunition request provides for increased readiness by buying more rounds for artillery for essential modernization by procuring smart munitions such as Copperhead, and for improved sustainability through modernizing old production facilities and increasing explosives and propellants production capability. Each component of the ammunition budget responds to a deficiency in readiness, modernization, or sustainability. The stabilization of the ammunition account is key to providing the warfighting capability we need.

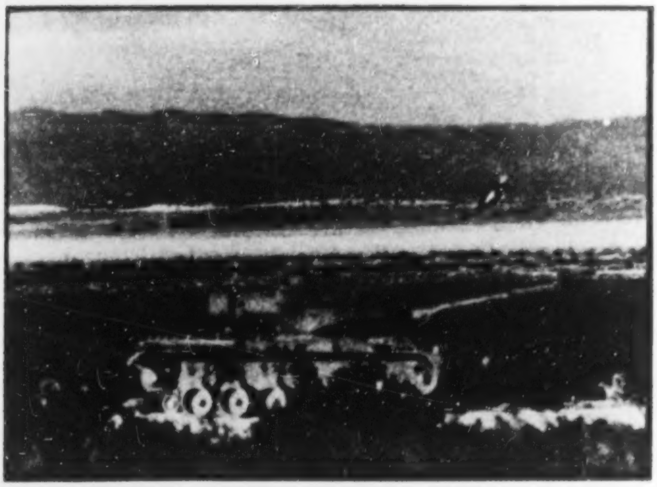
Within the Army budget, field artillery ammunition has been allotted the largest portion of our resources for munitions procurement. Major items in this category are 8-inch and 155mm Improved Conventional Munitions, Copperhead, 155mm Area Denial Artillery Munitions and Remote Antiarmor mine system projectiles.

Opportunities exist for making our weapons more effective through the use of modern munitions and advanced guidance systems. By making greater use of these technologies we can achieve a significant increase in our conventional capability in a cost-effective and timely fashion.

The munitions research and development programs cover all types of conventional munitions from exploratory development through engineering development. Major areas include: technical base programs for large caliber munitions development and ballistics technology work applicable to all systems; development of modernized ammunition for the 105mm howitzers; field artillery munitions such as the Sense and Destroy Armor munition--a top attack, antiarmor submunition employing improved sensing for broad application to weapon systems such as 155mm howitzer; and numerous smaller projects for the development of fuzes and propellants. The FY86 request will allow the Army to continue this critical research and development area.

A successful product of munitions research and development is the precision guided projectile known as Copperhead. Until the advent of Copperhead, the field artilleryman faced the statistical probability of wearing out his gun tube before hitting a moving tank. This laser-guided 155mm howitzer projectile will change those odds dramatically. Copperhead is the only deployed field artillery munition with the ability to yield a high probability first round kill against moving hard point targets.

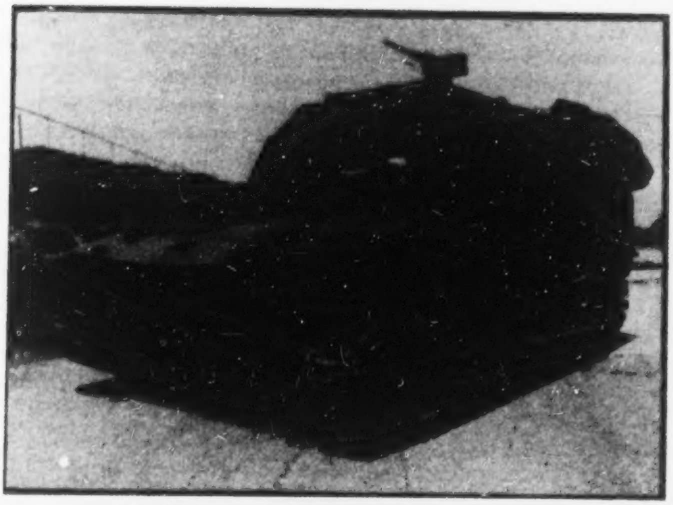
Copperhead is fired from existing 155mm howitzers. It uses a built-in, semiactive laser seeker which makes it possible for the round to destroy stationary or moving armored and other high value targets, at ranges of up to 16 kilometers, with a high single shot kill probability. As the projectile descends toward the intended target, its laser seeker searches for and acquires the reflections of a laser beam. This beam can be projected onto the target by G/VLLD, FISTV, AHIP or Apache helicopters or by a remotely piloted vehicle. The projectile corrects its course through the use of its fins as it "homes" to the laser spot on the target.



Copperhead

Copperhead has been in production since 1981 with over 8900 rounds produced through FY84. Since July 1982, Copperhead has demonstrated better than 80% reliability. FY86 funding will be used to procure 3253 rounds to continue to build our inventory.

As a part of our modernization effort, we are also looking at improvements in ammunition hauling, handling, and survivability. In FY83 we initiated procurement of the Field Artillery Ammunition Support Vehicle (FAASV), which is equal in mobility to the self-propelled howitzers in our inventory and provides armored protection for both crew and



Field Artillery Ammunition Support Vehicle (FAASV)

ammunition. FAASV is being procured for deployment in Europe only. The FY86 request will add 197 FAASVs to the Army inventory.

AIR DEFENSE

The Army's Air Defense mission area includes those activities involved with the detection and engagement of the enemy air threat with ground-to-air gun and missile systems, in coordination with Air Force interceptor aircraft.

Without adequate Air Defense coverage, our ground combat elements, supply lines, command centers, Air Force strike bases and other high-value targets are exposed to destruction by fixed-wing and rotary-winged attack aircraft. Warsaw Pact forces have over 3,600 combat aircraft in Central Europe, including bombers, fighters, and helicopters. Quality and quantity are on the rise. Ground attack aircraft such as Flogger, Fencer, the Ground Support Fighter, and the HIND attack helicopter pose a deadly threat to armor and mechanized forces. In addition to the aircraft threat, there is an increasing threat from the growing numbers and types of ballistic missiles and air-launched missiles. Without adequate air defense protection, our ground combat forces and support elements will be seriously threatened.

For many years, our air defense needs have been served by Redeye, Vulcan, and Chaparral--the Short-Range air defense systems, and the medium to high altitude Air Defense capability, which includes I-Hawk and Nike-Hercules. The Army's air defense modernization plan provides a mix of systems to be fielded that will be effective against the postulated air threat into the 1990's. In this section, we will first discuss our largest air defense system, Patriot, and work our way to the manportable Stinger air defense weapon.

In future wars, we can expect to experience saturation raids by large numbers of sophisticated aircraft employing electronic countermeasures. Intense electronic jamming and limited firepower capabilities threaten the usefulness of our current systems, Nike-Hercules and Hawk. Therefore, we are fielding Patriot to replace Nike Hercules and improving Hawk to counter the threat.

One of the main shortcomings of Hercules, which has been in the force since 1958, is that one battery can engage only one aircraft at a time. The operator has to wait until the first missile intercepts a target before firing another. Patriot can simultaneously attack and destroy several enemy aircraft while tracking scores more.

Due to its advanced technology, Patriot is operated with fewer soldiers than its predecessors. Each Patriot launching station contains four ready-to-fire missiles. The missiles, which are sealed in a canister that serves as both shipping container and launcher tube, require no field maintenance. Each Patriot battery contains up to eight trailer-mounted launchers that can be widely dispersed. Communication with the Engagement Control Station is made via secure data link.

Patriot

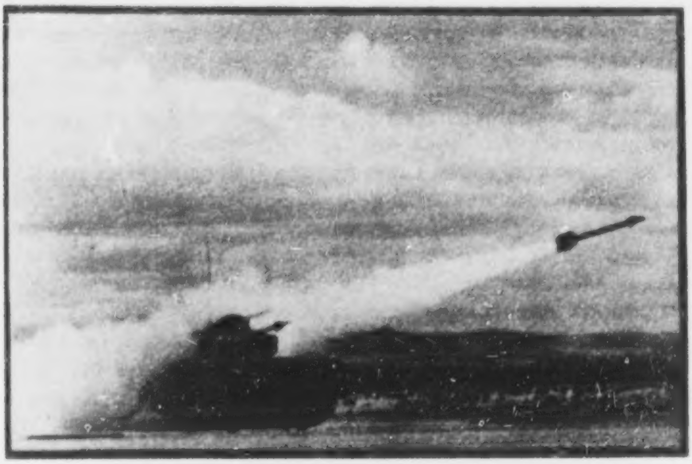
Enemy targets can be tracked and prioritized for destruction through the interaction of Patriot's radar and computer. The radar can guide several missiles at the same time, updating priorities as threat aircraft are simultaneously engaged. Patriot employs a new guidance concept called Track-Via-Missile. As the missile reaches the area of an enemy aircraft, it informs the radar where it is in relation to the target. A computer then makes calculations and directs the missile on a path that insures a kill. Operating modes vary from manual mode to fully automatic mode. The system's two operators always retain full override capability over computer decisions.

The Patriot system is currently in production and is being adopted by our NATO allies. The first fully trained and operational battalion was deployed to Europe in early 1985. The FY86 budget will support the procurement of additional fire units and support the continued fielding of the system. It is the world's finest air defense system and can defeat any aircraft in existence today.

I-Hawk

The mainstay of the Army's low-to medium-altitude air defense is the Hawk missile system. Although Patriot will replace some Hawk units, the Hawk force will be retained indefinitely. Ongoing and planned product improvements will upgrade Hawk system performance to meet the projected threat of the 80's and 90's. The upgraded version will have a simultaneous engagement capability against close-in saturation attackers, increased detection range, improved reliability, and greater effectiveness against jamming. Twenty foreign countries have bought the system, and procurement interest has been expressed by several others. Part of this worldwide acceptance can be attributed to Hawk's performance in the 1973 Mideast war, where, in its basic configuration, it downed more than 20 MIG's and other aircraft. The FY86 budget will fund continued product improvements and procurement of replacement rocket motors.

Chaparral, the Army's short-range air defense missile system, was first fielded in 1969. It will remain in the active inventory through the 1990's, and beginning in 1984 will be provided to National Guard Air Defense units. To keep Chaparral current against the threat, a new missile using Rosette Scan Seeking (RSS) techniques will be procured starting in FY86. In addition, an ongoing product improvement program will improve system operability and maintainability.



Chaparral

Improvements fielded to date include an improved infrared guidance which provides a forward engagement capability, an Identification Friend or Foe (IFF) System to assist the gunner in identifying friendly aircraft, and a smokeless rocket motor that increases survivability by reducing the visible smoke trails when missiles are launched.

Future improvements include adding Forward Looking Infrared (FLIR) for improved adverse weather and night target acquisition, and other modifications to improve system performance, reliability and NBC protection.

Chaparral is effective against aircraft and helicopters of all types flying at low altitude. It provides protection for divisional and rear area critical assets to include air bases. Chaparral, with programmed improvements, is the most cost-effective short-range air defense missile system option available to the Army.

The Short-Range Air Defense Command and Control (SHORAD C^2) system is being developed to provide maximum effectiveness from our short-range air defense weapons. This C^2 effort focuses on increasing the probability of successful engagement of hostile targets by insuring rapid, timely, dissemination of C^2 information, alerting and cueing data and improving our capability for aircraft identification.

The present SHORAD method of accomplishing command and control is totally manual. Weapons control information and sensor data from Air Force and high to medium altitude air defense systems is provided through voice communications. This information is received at a central control facility at the SHORAD battalion where it is manually filtered, plotted and retransmitted by voice to the appropriate air defense and ground combat elements. This method is time-consuming and limits the probability of successful air defense operations.

The SHORAD C^2 development will automate and streamline this process to enable us to successfully engage the magnitude of air threat we anticipate within the division airspace. Computer processors, graphic displays, terminals and data links will replace most human actions and voice communications in order to provide the SHORAD gunners and commanders with the required data quickly and simply and with responsive, flexible, less restrictive weapons controls. The FY86 funds continue full-scale engineering development that began in FY85

The ability to identify hostile aircraft remains a significant limitation to our air defense forces, particularly for short range air defense weapons which operate beyond visual range through our improvement and acquisition programs. Our efforts are focused on noncooperative identification of both hostile and friendly aircraft. Several of these have shown excellent potential in early demonstrations. We are making limited improvements in our current cooperative friend identification systems and participating in tri-service development of new friend identification system for selected air defense systems.

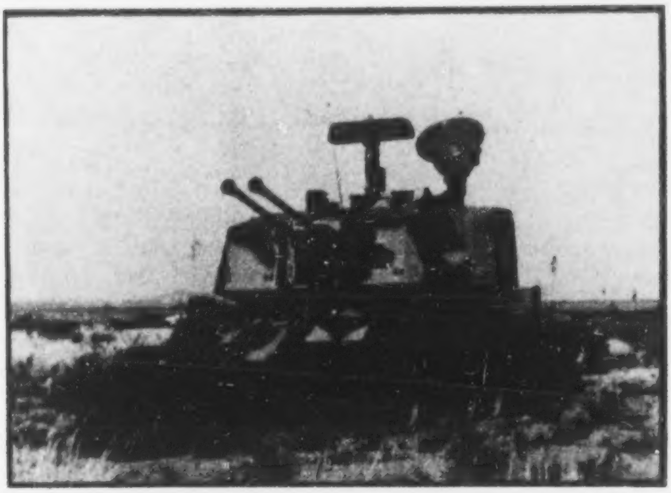
Improved positive hostile and friend identification capabilities combined with improved, automated command and control capabilities will maximize the effectiveness of our air defense forces. FY86 funding continues advanced development and testing of improved identification capabilities.

Product Improved Vulcan

The Product Improved Vulcan Air Defense System (PIVADS) is being developed to improve tracking and gun pointing accuracies and increase reliability and availability of the current 20mm Vulcan air defense gun. Improvements include the replacement of the present disturbed recticle by a director type sight, the replacement of the analog computer with digital fire and control electronics, modification of azimuth and elevation systems to reduce backlash and incorporation of built-in-test equipment. A contract has been signed for 285 PIVADS kits and modification is expected to begin in early 1987. Other improvements may include improved 20mm ammunition for both PIVADS and Vulcan and integration of Stinger with PIVADS creating a PIVADS hybrid.

We have developed the SGT YORK Air Defense Gun System to provide air defense protection for the forward deployed forces in our armored and mechanized units. This system was developed under a unique accelerated acquisition strategy which featured a government "hands-off," competitive engineering development phase, culminating in a head-to-head "shoot-off" by the two competing contractors. This acquisition strategy cut several years off the development cycle and reduced costs.

The SGT YORK is a twin 40mm gun system with digital fire control, and acquisition and track radars mounted in an armored turret. The turret is mounted on a modified M48A5 tank chassis. SGT YORK is capable of engaging high speed, fixed-wing aircraft and helicopters that pose a threat to our forward maneuver forces. This fast reacting, highly accurate system fires high explosive, point-detonating or proximity-fuzed ammunition. In addition to its air defense role, the SGT YORK can be used in a ground defense role to destroy lightly armored combat vehicles.



SGT YORK

The Secretary of Defense decided not to award the FY84 Option III (117 systems) until completion of FY85 testing. The Army subsequently negotiated an extension to Option III at no additional cost to the government. FY86 funding will procure 117 SGT YORK systems, initial spares and associated system peculiar support equipment and ammunition.

Plans are underway to produce improved SGT YORK with the STINGER missile to keep pace with the growing threat. This improvement will enhance SGT YORK's capability and will make it more difficult for the threat to counter a gun/missile combination.

Stinger is the Army's manportable air defense missile system. It provides air defense protection for forward deployed ground combat units. Stinger was developed to replace the aging Redeye system, which was first fielded in the mid-1960's, and which has limitations when matched against the current and projected enemy air threat.

STINGER

Stinger overcomes many of Redeye's shortcomings with improved range and maneuverability, the ability to attack much faster targets, and, most important, the ability to attack aircraft from any angle. The missile uses a passive infrared seeker that homes on the exhaust plume of a target. A proportional navigation system enables the Stinger to fly an intercept course to the target. The high-explosive warhead is designed to penetrate the aircraft before exploding in order to insure a kill. These capabilities provide an enormous advantage over the Redeye system, which is a "revenge" or tail-chase system only.

Stinger was designed with built-in growth potential in mind and an improved Stinger seeker, Stinger-POST, completed development and began production in FY83. This seeker will improve Stinger performance in a countermeasures environment. Development of an additional improvement, the Reprogrammable Micro-processor began in September 1984. The Stinger missile was initially deployed to active Army units in Europe in February 1981. FY86 funding continues production of Stinger-POST.

The importance of getting our new air defense systems to the field cannot be overemphasized. They will provide needed improvements in capability as well as making more efficient use of our air defense manpower.

COMBAT SUPPORT

The Combat Support mission area includes those systems designed to provide operational support to the soldiers in the combat area. Included in this mission area are engineer support to include mine and countermine operations, support of combat operations in a nuclear and chemical environment, the conduct of electronic warfare operations, and the provision of tactical intelligence to support combat operations.

We are well acquainted with the Soviet use of massed armor and the formidable threat it poses to our forces. Minefields, obstacles, and protective barriers are several means of making the enemy's job difficult. Mines can destroy the tanks spearheading an attack and cause disruption and delay in the enemy's advance, or deny him access to planned avenues of approach. If the enemy commander decides to halt and clear a path through the minefield, he must compress his formation and expose himself to our concentrated antitank and artillery fires. If he attempts to run through the minefield, he will pay a heavy price in tanks. Finally, avoiding the minefield costs him time and may well force him to maneuver his force into our preselected kill zone or into disadvantageous terrain.

On a fluid, rapidly changing battlefield, it is imperative that minefields be emplaced as the ebb and flow of battle dictates. In the past, the emplacement of mines was a slow and laborious process, and mines had to be emplaced long before the enemy commander had declared his intentions. Our new family of scatterable mines changes this situation.

The Ground Emplaced Mines Scattering System (GEMSS) is now in production and we will continue to provide for procurement of GEMSS anti-tank and anti-personnel mines in FY86 (24,000 AP/84,000 AT). In addition, we will begin procurement of two additional scatterable mining systems, the Volcano system and the Modular Packed Mine System (MOPMS). Volcano is a rapid mine dispensing system with mines loaded into mortar-tube-like canisters which can be placed in common dispenser racks for helicopter or ground vehicle use. Volcano will give our light forces their first capability to employ mines on a large scale. For example, a single Blackhawk (UH60) helicopter can deliver over 800 Volcano mines in a single pass. Ground vehicles can deliver similar quantities. MOPMS is a foot-locker sized module containing 21 mines. MOPMS will replace the heavy and bulky conventional mines used now as a basic load in combat arms units and will also be used in special mining situations such as closing lanes and gaps. MOPMS mines are explosively deployed from the module when a threat arises. The MOPMS module can be retrieved for future use if the mines are not deployed. The other side of the coin to mines is countermining. We can expect the threat to fully exploit his extensive mining capability. Mines pose one of the most serious threats to mobility as was proven in Vietnam, Lebanon and the Falklands. They were used extensively in WWII and anywhere we fight we will encounter them. Our combat units require versatile and potent countermine systems to provide the mobility necessary in the AirLand Battle. Yet we are far from having a satisfactory countermine capability in the field, while the Soviets are well equipped in this critical area. One key item of our program is an explosive line charge called MICLIC for Mine Clearing Line Charge. It will clear a tank width path of some 300 feet through a mine field. Procurement of this system begins in FY86. Mine rollers for our tanks and a complementary mine plow will also be procured in FY86.

As key members of the combined arms team, engineers have responsibility for providing specialized support to insure the mobility, countermobility and survivability of the maneuver elements. In the lethal environment of the main battle area, the combat support role of the engineers greatly increases the combat effectiveness of our fighting forces by providing terrain reinforcement, construction of fighting positions and obstacles, breaching barriers, clearing obstacles and preparing bridge crossing sites. Today this mission is even more critical as the battlefield becomes increasingly mobile.

Armored Combat Earthmover

The M9 Armored Combat Earthmover (ACE)is uniquely capable of accomplishing all of these mobility, countermobility and survivability tasks in the forward area of the battlefield. The M9 has the speed and all-terrain mobility to move with the combat force and provide critical support when and where needed. The M9 offers armor protection against artillery fragments and light direct fire weapons as well as operator protection against chemical and biological agents. The M9 is air transportable and air droppable. It can swim, dig, bulldoze, haul and move with the flow of the battle. The M9 is an essential element of a highly mobile combined arms team. The FY85 program funds a follow-on evaluation which will lead to a production decision for a first quarter FY86 contract award.

Chemical warfare may very well be the Army's most vulnerable area in the 1980's. Even though the US is formally committed to the policy of "no first use" of lethal or incapacitating chemical agents by adherence to the Geneva Protocol of 1925 and seeks a complete and verifiable ban of lethal chemical weapons, the threat to our forces is high.
Today, US forces are facing a chemical threat from an adversary that is the best prepared nation in the world in the use of chemical warfare. Without question, the Soviet Union possesses a formidable offensive capability to wage chemical warfare for an extended period and their leadership continues to devote significant resources to research, development, and procurement of more advanced chemical weapons and equipment. They also have a large and well-equipped dedicated chemical force. All units within their armies train extensively for chemical warfare, including the use of live agents in training.

Given the disparity between US and Soviet chemical warfare capabilities and evidence of Soviet use of chemical warfare directly or through surrogates, we must promptly modernize our own retaliatory capability. The US currently has a limited stockpile of chemical munitions. All of these munitions are of the unitary design; that is, they contain the actual agent in its final form. These munitions are all over 16 years old, and they are costly to store, maintain in a usable status, and transport in a safe manner. Additionally, the stockpile is composed of weapons and agents that are inadequate and in some cases inappropriate for the modern battlefield. The best option for developing and insuring a credible retaliatory stockpile in support of the national policy of deterrence is binary modernization. The binary concept uses two separated nonlethal chemical components that combine during the flight to the target to form a lethal chemical agent. In addition to the added safety and flexibility afforded by binary munitions during production, storage, and movement, binary modernization will allow us to update weapon and agent mix. Accordingly, an R&D effort is underway to apply binary technology to rocket and missile warheads.

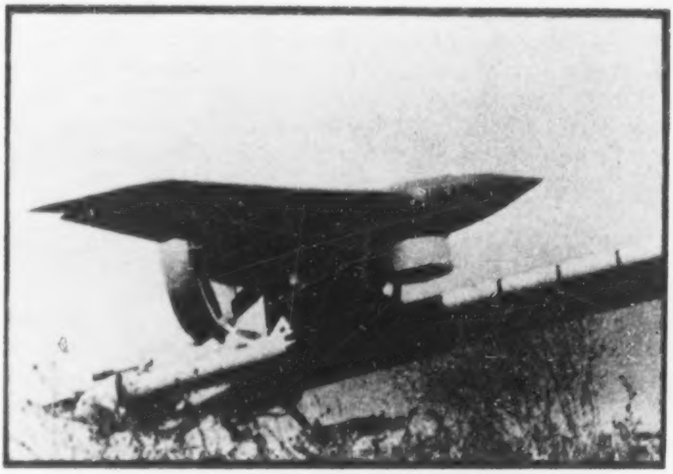
The Congress, recognizing the need to modernize the chemical weapons stockpile, appropriated $23.15 million in FY81 for construction and facilitization of the Integrated Binary Production Facility at Pine Bluff Arsenal, Arkansas, to allow for future production of the 155mm GB-2 (nonpersistent) artillery round. Initial construction began in October 1981, and was completed in December 1984. The Army FY86 program includes funds for procurement of 155mm projectiles. Also, the Army ammunition production base in the FY86 program requests facilities to produce Bigeye Bombs in support of Navy and Air Force procurements.

In addition to modernizing the chemical weapons stockpile, we must continue the procurement of chemical protective equipment in FY86 to improve the ability of our forces to survive an initial chemical attack. More procurement, research, and development are required before we can sustain combat operations in a chemically and biologically contaminated environment. A new protective mask providing improved protection and a simplified collective protection system for use by tactical units will be procured beginning in FY86. Also, collective protection systems will continue to be integrated into our command, control, and communications systems and combat vehicles.

The FY86 chemical-biological program continues our efforts with universities and industry to broaden the technology base required to support materiel needs and to develop improved chemical-biological defense materiel. Development will be completed on a new protective mask and continued on numerous items of collective protection equipment for shelters, vans, and tactical armored vehicles. In the chemical-biological agent detection and alarms area, development will continue on a remote sensing alarm, an automatic chemical agent detector alarm, and an automatic liquid agent alarm. Work will also continue on improved decontamination systems including a rapid decontamination system for tactical vehicles.

Nuclear artillery projectiles have provided part of the US nuclear deterrent for the past 30 years. Currently fielded nuclear artillery projectiles, which incorporate 1950's era technology, must be replaced to assure continued reliability and effectiveness. Modernization programs are underway. We are completing procurement of the 8-inch nuclear artillery projectile now and development of the improved 155mm nuclear projectile is continuing. These nuclear artillery projectile programs will provide us with a Short-Range Nuclear Force (SNF) that will continue to provide a credible nuclear deterrent by assuring the collective survivability of NATO SNF and enhancing the survivability of our conventional firepower.

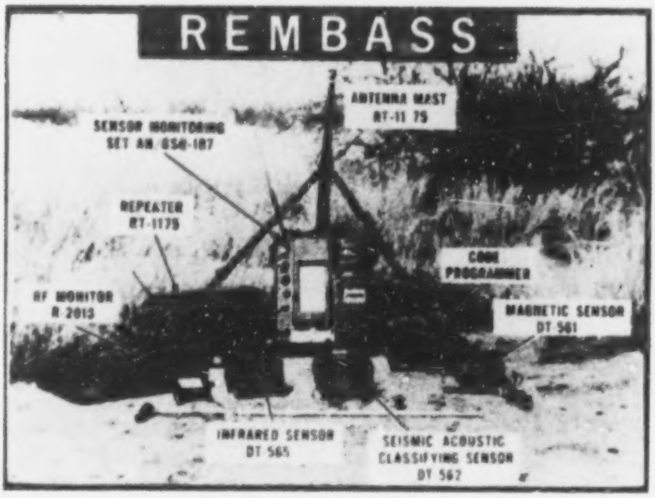
Historically, a ground commander's greatest shortcoming has been the lack of information concerning the enemy's location, disposition, and intentions. With the introduction of the Remotely Piloted Vehicle (RPV), a relatively small, propeller-driven, remotely controlled aircraft, the commander has an enhanced capability to gather intelligence behind enemy lines. The Remotely Piloted Vehicle has the capability to fulfill several important battlefield functions. It is designed to fly into hostile territory and locate targets, adjust artillery fire, and laser-designate targets for destruction by laser-homing artillery or missiles. It can also perform reconnaissance, damage assessment, and other functions. The RPV will carry a small television camera and a laser designator/rangefinder or a Forward Looking Infrared (FLIR) night vision sensor with laser designator/rangefinder.



RPV

The RPV can fly above key enemy zones in order to gain required data when the defensive strength of the enemy is likely to make manned reconnaissance extremely risky. Small RPV's, which are difficult to track and hit with radar or visual systems, will enable us to fly reconnaissance missions without risking manned systems. The RPV Full Scale Development (FSD) testing started in July 1982. Since then eighty-five flights have been flown with an overall success rate of 87%. Approximately 286 more flights will be flown as part of the continuing FSD test program. Launch, recovery, navigation, telemetry of TV video, jinking, 3-hour endurance, long-range hand-off between ground control stations and laser designation for Copperhead have all been demonstrated. An Early Operational Capability (EOC) system was provided to the 1st Cavalry Division at Fort Hood, Texas in August 1984. The prototype system is soldier-operated and used to support field training exercises as well as to provide valuable data to the developer and testers in preparation for developmental and operational testing. The EOC system has experienced a 100% flight success rate to date. FY86 RDTE funds will support continuation of developmental and operational tests, continuation of development of the FLIR night vision sensor, and provide for two early operational capability systems which will be available in calendar year 1986. The FY86 procurement funds will fill the first of three increments of the training base (three air vehicles and one ground control station) and one RPV section (five air vehicles and two ground control stations).

Interdiction is a key to battlefield success. The enemy's momentum can be diminished by attacking high-value second-echelon targets, thereby reducing his ability to mass and build up momentum. To accomplish the interdiction mission, a combination of mutually dependent sensor and computer-based tactical systems provides the tactical commander the ability to detect targets and rapidly disseminate surveillance and target attack data. The Remotely Monitored Battlefield Sensor System (REMBASS) is one of these systems. It is a combination of seismic-acoustic, magnetic, and infrared sensors that are hand emplaced and remotely monitored. The sensors detect, classify and report movement of personnel and wheeled and tracked vehicles. REMBASS provides the tactical commander with an urgently needed all-weather, terrain-independent system for forward area operations, and a rear area intrusion detection and target development capability. It is a light, easily deployed, maintainable system that is well suited for contingency forces faced with wide frontages, extensive depths, and gaps between adjacent units. FY86 funds will continue the procurement of this fully developed program.


REMBASS
ANTENNA MAST
RT-11 75
SENSOR MONITORING
SET AN/GSQ-187
REPEATER
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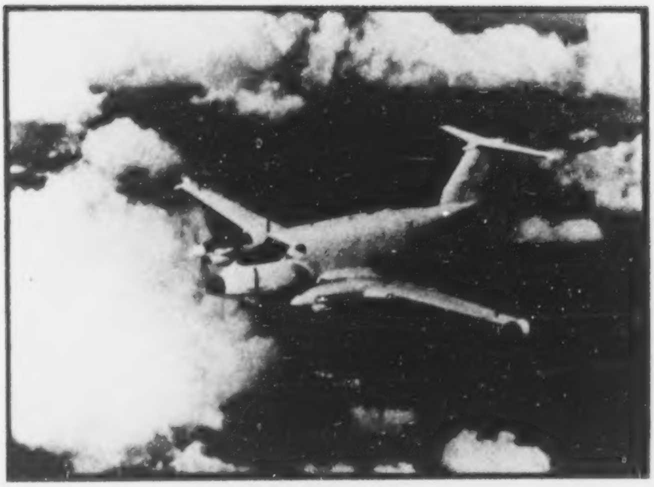
PROGRAMMER
RF MONITOR
R 2013
MAGNETIC SENSOR
DT 561
INFRARED SENSOR
DT 565
SEISMIC ACOUSTIC
CLASSIFYING SENSOR
DT 562

Modern sensor systems are capable of providing massive volumes of raw intelligence data. In order to be of use to the tactical commander, the collected data must be correlated, integrated, and interpreted with minimal delay. The manual processes now employed in the analysis of tactical intelligence information are inadequate to cope with the volume of collected data in sufficient time to satisfy the commander's needs. The Joint Tactical Fusion Program will remedy this situation through the introduction of automated tactical intelligence fusion systems for the Army and Air Force. The Army system, the All Source Analysis System (ASAS), will provide automated assistance to intelligence processing (fusion) and will also support related areas such as target development, collection and mission management of intelligence and electronic warfare systems, and operations security. The Enemy Situation Correlation Element (ENSE) will perform similar functions for the Air Force and is being developed concurrently with the All Source Analysis System. Maximum commonality in hardware and software is planned between the Army and Air

Force systems to ensure that the ground and air commanders share a common perception of the enemy situation. Timely and accurate tactical intelligence is so critical to the effective conduct of combat operations that the development of automated fusion systems has been accelerated. Current plans call for fielding of baseline fusion systems beginning in the mid-1980's. These baseline systems will undergo evolutionary development leading to the fielding of objective systems before the end of the decade. The FY86 funding supports the continued development of baseline ASAS systems and provides for the procurement of hardware needed to develop and integrate those systems.

The Joint Surveillance and Target Attack Radar System (JOINT STARS) will provide wide area surveillance of the battlefield. It will have both a moving and a fixed target capability permitting detection and location of targets such as fixed and moving vehicles, command posts, assembly areas, and low-flying helicopters and fixed-wing aircraft. JOINT STARS will broadcast simultaneously to multiple ground stations at division and corps, and will be integrated with the All-Source Analysis Center and the Advanced Field Artillery Tactical Data System to provide both battlefield management and quick-reaction, realtime targeting. Operational effectiveness will be enhanced by cueing from other sensors. FY86 funds will be used to develop the ground station; the airborne portion of the system is being developed by the USAF. The platform will be the C-18 (militarized Boeing 707). There are currently four aircraft involved in the R&D effort.

Offensive electronic warfare operations are calculated to disrupt enemy command, control, and communications capabilities. Every unit is tied by an electronic apron string to its next higher echelon. Disrupting the Soviets' communications network by means of electronic warfare may be a key means of slowing a Warsaw Pact attack, thereby making it vulnerable to eventual defeat. The commander of a force needs to know what the enemy is doing. One way he can get this information is through communications intercept and radars. Army systems to provide location and intercept of communications and radar emitters are mounted in aircraft and in wheeled or tracked vehicles. The TRAILBLAZER and TEAMPACK systems, which are currently being fielded, are ground-based systems whose targets are, respectively, communications and radar signals. The airborne systems are GUARDRAIL and QUICKLOOK which are fielded, and are being upgraded through product improvements.



Guardrail

Guardrail V is a combined airborne sensor and ground processing facility communication intelligence system with proven ability to provide near-realtime data on the location of enemy electronic emitters. Guardrail, in the RU-21H platform, has some limitations such as an unpressurized aircraft and limited frequency coverage. Thus, we are continuing the procurement of the Improved Guardrail (RC-12D), a system that corrects those limitations.

Quick Fix is an airborne offensive communications intercept and jamming system that will deny the enemy the use of his radios during key periods of battle. It does this by intercepting and jamming enemy communications. Quick Fix is designed to operate against air defense units and maneuver units. Quick Fix I is currently employed in a modified EH-1H aircraft. Future Quick Fix II systems will be mounted in the EH-60A BlackHawk aircraft.

Quick Look II

Quick Look II is an airborne, computer-controlled system mounted in a Mohawk aircraft that detects, locates, and identifies enemy radars. It provides tactical field commanders with timely data on enemy missile, artillery, and antiaircraft weapons. The FY86 budget contains limited funds for product improvements to the aircraft and includes RDTE funds to support the consolidation of Guardrail and Quicklook into a single platform. Procurement funds start in FY88.

In the area of ground-based jammers, our Combat Electronic Warfare Intelligence (CEWI) units will be equipped with the medium-power AN/TLQ-17A jammer and the high-power AN/MLQ-34 TACJAM jammer. In addition, the Army is developing a family of low-power, expendable jammers that are designed for hand emplacement or delivery by artillery projectiles. Procurement of the hand-emplaced jammers began in FY84. Additionally, the Army is equipping Combat Electronic Warfare Intelligence (CEWI) units with the VHF radio electronic countermeasures set, AN/VLQ-4. This device allows us to use our AN/VRC-12 series tactical radio to jam the enemy and provides an ECM training capability to both the active and reserve forces. The FY86 budget will support the continued development and acquisition of electronic countermeasures capabilities for active units.

COMBAT SERVICE SUPPORT

In the initial stages of most potential conflicts, we can expect to fight outnumbered and outgunned. Therefore, the commander must have the ability to move forces rapidly about the battlefield in order to optimize their overall effectiveness and to avoid decisive engagements with forces having superior strength. The key to this capability is enhanced mobility, both air and ground, which enables us to position our forces in the right place at the right time. The Combat Service Support major mission area is an aggregation of mission areas designed to provide the commander the support to the weapons systems, support systems, and their operators and crews.

The Blackhawk helicopter, the high end of the high-low utility helicopter mix, will perform air assault, air resupply and aeromedical evacuation missions, and answers the Army's need for improved battlefield mobility. Its predecessor, the UH-1, is an excellent and reliable helicopter, but is power-limited so that during hot weather and in high-altitude conditions, its payload is greatly reduced. Furthermore, in Vietnam we learned that we must reduce the vulnerability of future helicopters to small arms ground fire.

UH-60 Blackhawk

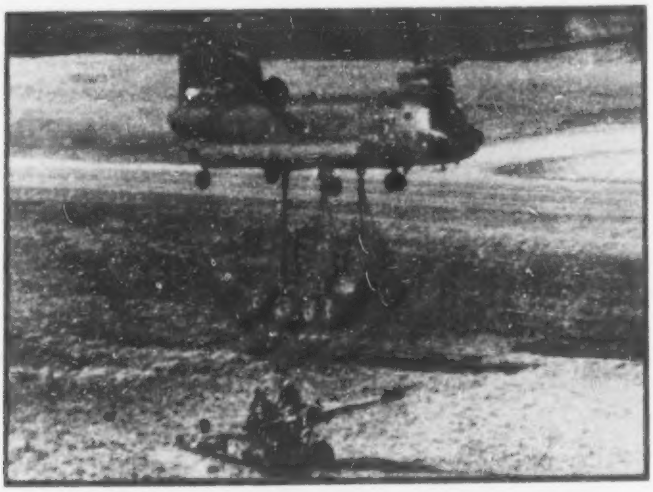
Blackhawk is clearly superior to the UH-1. It can carry more than twice the UH-1 payload and can transport a complete, fully equipped squad faster in most weather and altitude conditions. Blackhawk also adds significantly to the mobility of the division by having the capability to reposition equipment such as the 105mm howitzer, its crew of six, and up to 30 rounds of ammunition in a single lift.

The critical components in the Blackhawk are either armored or redundant to enable it to withstand multiple small arms hits. Tests have demonstrated its ability to continue flight for a minimum of 30 minutes after sustaining damage from projectiles as large as the 23mm high-explosive incendiary round. The airframe is designed to absorb impact forces by progressively deforming on impact, thereby protecting the crew in a crash. The Army's experience in Grenada with the Blackhawk proved the aircraft to be very survivable.

Blackhawk

Blackhawk fielding for the 101st Airborne Division, 82d Airborne Division, 9th Infantry Division, 24th Mechanized Division, and initial fielding for our units in Europe is complete. Fielding to Korea is complete with fielding to Panama and WESTCOM in process followed by a resumption of fielding to FORSCOM.

The Blackhawk is presently being procured under a second multiyear contract (FY85-87), which has significantly stabilized the production base and produced substantial savings to the Government. FY85 was the last year of a FY83-FY85 T700 series contract and included procurement of engines for the Army's UH-60 Blackhawk, AH-64 Apache and the EH60 Quick Fix, the Air Force's HH-60D Night Hawk, and the Navy's SH-60B SeaHawk. This program has been so successful that the Army will request a follow-on (FY86-88) multiyear procurement. The FY86 request funds the first year of that 3 year multiyear contract. The program continues toward meeting the procurement objective of 1107 Blackhawks. The Army has accepted 600 Blackhawks as of December 1984.



CH-47D Modification Program

Another element of the Army's Combat Service Support mobility team is the CH-47 Chinook medium lift helicopter. Its primary missions include the tactical movement of artillery, troops, and special weapons on the battlefield, as well as the movement of ammunition, repair parts, petroleum, and aircraft recovery.

We plan to modernize our fleet to the CH47D model, thus insuring that the helicopter will have a useful life well beyond the year 2000. The CH-47D helicopter has a greatly increased payload capability over earlier models. Composite rotor blades, T55-L712 turbine engines, advanced flight control system, single point pressure refueling, and modularized hydraulic systems have improved the reliability, availability, and maintainability of the aircraft. Initial operational capability was achieved on schedule in February 1984 at Ft. Campbell, Kentucky. The benefits of this program to the operational units have been demonstrated by an average of better than 85 percent full mission capability rate during the first year in the field.

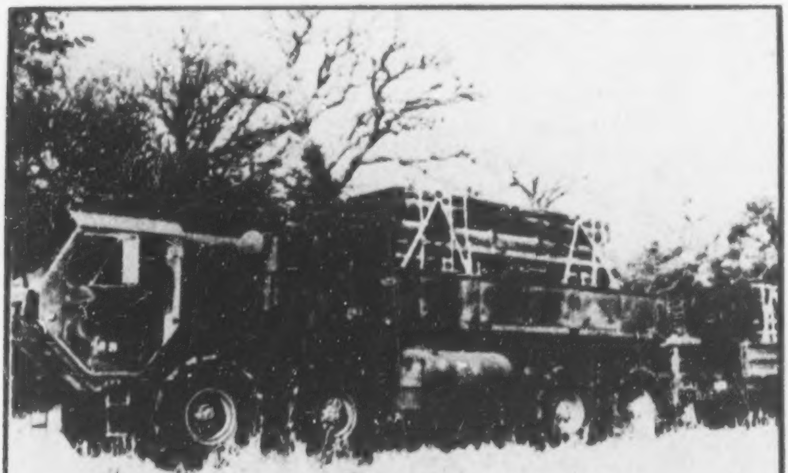
The FY86 budget will fund the 6th year of this effort and the second year of a proposed 48 aircraft-per-year multiyear procurement of the modernized Chinook. This continues to be a stable program with deliveries ahead of schedule and below target cost.

While other elements are essential to rapid resupply and mobility, tactical wheeled vehicles have been and will remain the backbone of our logistical system. They are vital to the fielding of new weapon systems and tactical operations Army-wide. We have a planned program to acquire tactical trucks over time to meet these needs; to fill shortages; and replace over-age, obsolete and less capable vehicles.

5-Ton Truck

Heading the list of workhorses is the 5-Ton Truck. It supports the introduction of such major systems as the Patriot, Pershing II, and TACFIRE, as well as meeting ammunition, general cargo transport, and other special-purpose needs. In FY81, a competitively awarded 5-year multi-year contract was signed with AM General Corporation for 11,394 product improved 5-Ton Trucks, with an option to increase production by 100%. To meet critical Army requirements, as well as other Services' requirements, the option has been exercised. FY86 will be the second year of a new 3-year multi-year contract awarded in 1985. As of December 1984, over 11,000 new 5-ton trucks have been accepted by the Army. Additionally, in 1986, we will begin prototype evaluation of a new concept 5-ton truck that will be lighter, more air transportable, mobile, and fuel efficient. We plan to begin buying this new truck in the early 1990's.

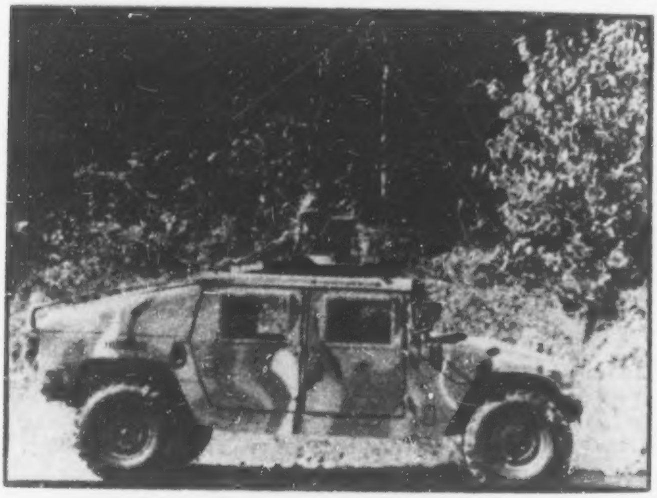
The Army 10-Ton Heavy Expanded Mobility Tactical Truck (HEMTT) is a vehicle that features an assemblage of commercial components. A competitively awarded five-year multiyear contract was signed with Oshkosh Truck Corporation in FY81 for 2,140 HEMTT's, with an option to increase the quantity by 250%. The HEMTT meets high-priority systems requirements, such as Patriot, Pershing II, Multiple Launch Rocket System, and tactical unit ammunition and fuel transport requirements. In FY86 we will continue to acquire HEMTT vehicles using options available under a new multi-year contract to be awarded in FY86.



10-Ton HEMTT

Heavy tactical wheeled vehicles are critical for the transport of heavy cargo, fuel, and ammunition. But light-load requirements dictate the need for utility trucks. Presently, that need is satisfied by the M880, commercial pickup truck series of vehicles and to some extent by the M151 1/4-ton with a 1/4-ton trailer and M561 Gama Goat, 5/4 ton. We are now beginning to fill this light-load or 5/4-ton payload requirement by two vehicle families. The first vehicle family is the Commercial Utility and Cargo Vehicle (CUCV), which serves the needs of the Army, Marine Corps, Air Force and Navy.

As with the M880 series that it is replacing, the CUCV is a family of commercially available, off-the-shelf vehicles adapted to meet military needs. It consists of cargo, utility, and ambulance versions and is a four-wheel-drive, diesel-powered vehicle in a nominal 5/4-ton payload category for use on primary and secondary roads. The CUCV also has some cross-country capability. The CUCV program complies with congressional direction to commercialize at least 20 percent of the M151 1/4-ton jeep fleet. Fielding of CUCV's started in September 1983. FY85 is the last year of the 4-year multiyear procurement.



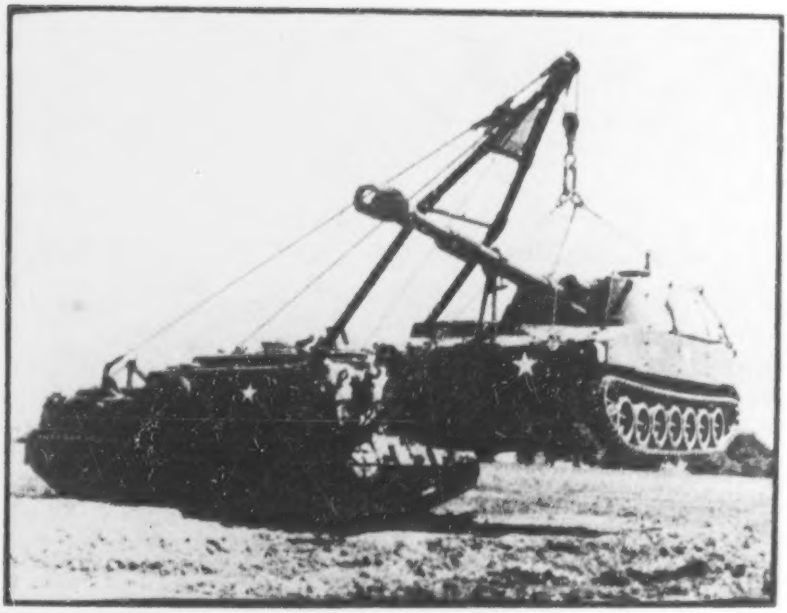
HMMWV

The other vehicle family in the 5/4-ton-payload category, is the High Mobility Multipurpose Wheeled Vehicle (HMMWV), which is complementary to the CUCV. The HMMWV is a nominal 5/4-ton-payload, diesel-powered, four-wheel-drive tactical vehicle that uses a common chassis with six body configurations: TOW weapons carrier, utility, ambulance, squad carrier, shelter carrier, and Stinger weapon carrier. Emphasizing the use of commercially available components, the versatile HMMWV has excellent on- and off-road capability, with a range of 300 miles. This vehicle will replace aging and obsolete vehicles in the light tactical fleet: the M561 GAMA GOAT, the M274 MULE, and M151 1/4-ton utility vehicles not replaced by the CUCV. It will perform in command and control, utility, forward observer, forward air control, and numerous other battlefield roles. This vehicle is one of our most important assets as we move toward lighter divisions. The tri-service HMMWV program also allows the Services to take advantage of the commercial production base. By combining requirements over a number of years, we are able to drive a better bargain with industry in a competitive environment and secure reasonable guarantees for quality, price, and schedule requirements. Such programs are attractive to industry because it can plan for several years of business rather than for one year at a time. These considerations foster private investment which assures higher productivity and a stronger industrial base.

Our challenge for the future is to maintain the stability of our program funding to meet existing, critical truck needs. An additional and important consideration is the logistics standardization that occurs among all the Services as a result of multiyear buys of common-use tactical vehicles. It's good for industry and good for the Armed Services.

Rounding out our combat service support transport requirement is the M88A1 recovery vehicle. The M88A1 supports the mechanized and armored combat soldier by recovering disabled tanks and other tracked combat vehicles from the battlefield. In the 1973 Mideast war, the Israeli Army demonstrated the importance of this capability by quickly recovering, repairing, and sending tanks back into the battle against a quantitatively superior enemy. This accomplishment was a key to the Israeli success.

Fielding of the M88A1 was initiated in 1977. A depot program to overhaul 863 gasoline-driven M88's and to convert them to diesel power was completed in FY82. The FY86 budget will fund the procurement of an additional 180 of these recovery vehicles.



M-88A1 Recovery Vehicle

Logistical support equipment gives our soldiers the vital support they need to fight successfully in sustained conflicts. In FY86, we will place greater emphasis on logistics research and development to enhance the operational capability, reduce the maintenance burden and extend mission reliability for our equipment. Logistics research and development and logistics support equipment requires your continued support.

Now that we have reviewed the mission areas that put combat power on the battlefield and sustain it in battle, we shall turn to the mission area that is essential for orderly execution of all battlefield missions--command, control, and communications.

COMMAND, CONTROL, AND COMMUNICATIONS (C3)

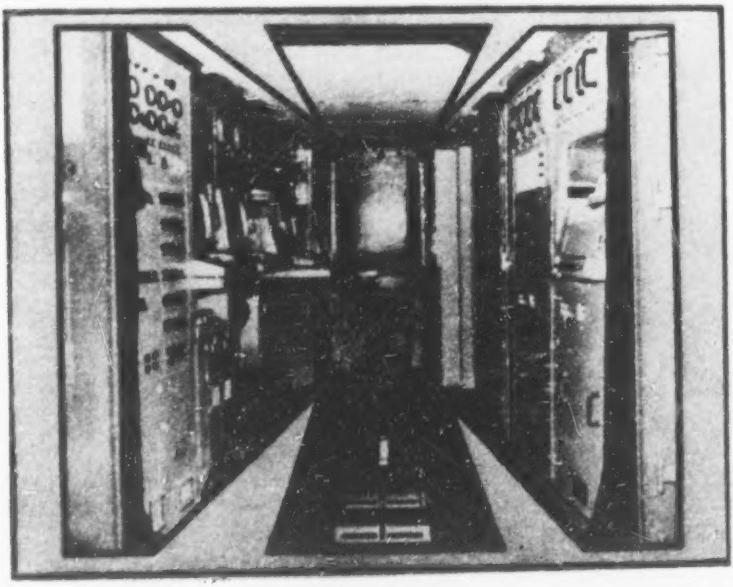
The command and control of our forces, and the communications which make it possible, are the keys to success on the battlefield. The C^3 function is analogous to the central nervous system of the body. The weapons and support systems discussed earlier are similar to muscles which react only on command and which function effectively only when they are controlled and coordinated. The systems discussed in the C^3 mission area provide the means by which we control, direct, and coordinate our forces. The importance of these systems cannot be overstated.

The C^3 mission area encompasses a staggering variety of demands and challenges. The demands range from a derivative of the Presidential "Hot Line," down to a simple squad radio capable of functioning under the rigors of combat. The challenges relate to an almost unbelievable number of conditions and complications. C^3 systems are affected by natural and man-made interference and they are subject to enemy interuption, direction finding and jamming. Many C^3 systems must be compatible with the sophistication of fixed site operations in peacetime and provide mobile capability during hostilities. In addition, C^3 systems must usually be compatible and interoperable with our sister Services and NATO allies.

Communications technology is a field in which the US possesses a degree of expertise that is the envy of the world. Due to affordability constraints, however, the Army's C^3 equipment has not kept pace with this technology advantage. The situation is getting better because of the increased emphasis on C^3 at all levels and the many modernization initiatives being pursued. With your support we will close the technology gap during the decade of the 1980's and will move from an era of grease pencils and manual switchboards to one in which the readiness of the Army's C^3 systems will be significantly improved by the systems we will now discuss.

The Army recently reassessed its communications architecture to insure that it was purchasing the correct mix of equipment to efficiently and effectively meet its battlefield needs. The major program included in this review was the Joint Tactical Communications (TRI-TAC) program, a Joint Service and DOD Agency program to develop and field tactical multichannel switched communications.

The broad goals of the TRI-TAC program are to achieve interoperability between Army and other DOD telecommunications systems, provide new equipment that reflects the most recent technology, eliminate duplication in development among the Services, and enhance interoperability with NATO systems.

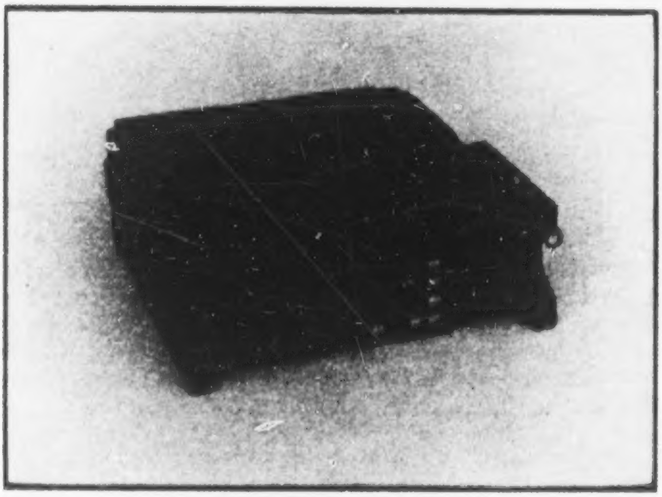


TRI-TAC

The TRI-TAC family of equipment consists of Mobile Subscriber Equipment (MSE), automated digital telephone and message switches, secure and nonsecure telephones, multichannel radio transmission equipment, automated control facilities, tactical data and facsimile terminals, and other associated items. This equipment is urgently needed to replace the obsolete, nonsecure, manpower-intensive, manual communications equipment currently in the field.

The MSE is the most important communications system in the FY86 request; it provides corps and division commanders with the secure, flexible, mobile communications needed for command and control on the modern battlefield. This year's request procures equipment for the first operational corps and division units which will be located at Ft Hood, Texas. The MSE acquisition is an example of an innovative approach which shortens the acquisition cycle by using a nondevelopmental strategy. It is based on a willingness to take advantage of existing, proven technology and developments by our NATO allies rather than trying to develop the "perfect" system. It enables the Army to avoid millions in development costs and start fielding a capability in 1987 rather than in the mid-1990's.

The FY86 request also provides funding for continued software development for various TRI-TAC items and the procurement of transmission equipment, unit level switches, automated control facilities, and various voice and data terminal devices together with associated communications security equipment.



SINCGARS

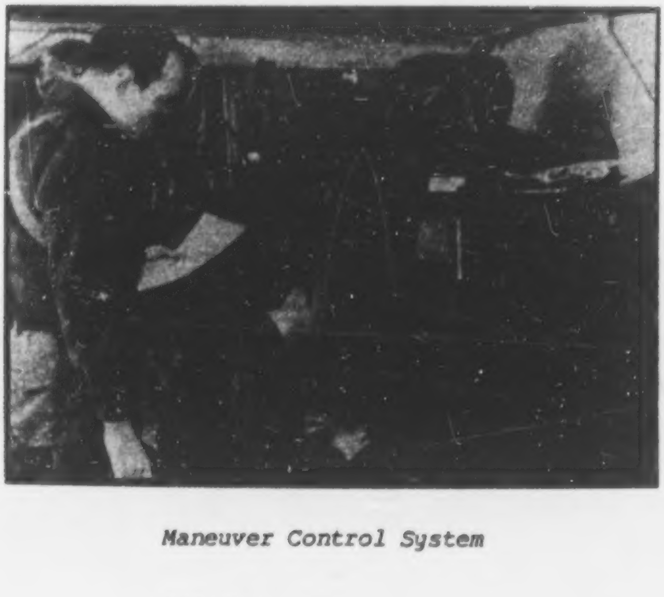
The Army does not presently have a tactical net radio system capable of operating in an electronic countermeasure environment. The Single Channel Ground and Airborne Radio System, (SINCGARS) will give the soldier a reliable jam-resistant, securable radio system capable of operating on the move and compatible with current vehicular radios and associated communications security equipment. The FY86 budget request continues the production of this urgently needed combat radio.

Any future conflict will require combat commanders to rapidly and precisely locate and identify their own forces, as well as other friendly units, on a highly mobile and extended battlefield. The Position Location Reporting System

PLRS

(PLRS), a joint program with the US Marine Corps, will give us that capability. It is cryptosecure, highly resistant to jamming and can be used in all weather and terrain. In the future, PLRS will be integrated with the Joint Tactical Information Distribution System (JTIDS) Class 2 terminal to form the Army Data Distribution System (ADDS). It will provide the Army with a reliable, jamresistant, data communications, navigation, and identification system for use in the five primary functional areas which require C^3 on the battlefield: maneuver control, fire support, air defense, electronic warfare/intelligence, and combat service support. We consider attainment of this capability a high priority for successful combat operations. Hence, the Army and Marine Corps initiated production of PLRS under a multiyear production contract in FY83 which will result in initial system fielding (of PLRS) for both services in 1986. The FY86 request provides for the final year of the 4-year multiyear contract. For the Army, the PLRS production contract establishes a production base for the follow-on ADDS system. Hence, the FY86 request also provides for production of ADDS through modification of PLRS production equipment and initial procurement of JTIDS. This request will result in initial system fielding of ADDS in 1988.

The commander's problem on the battlefield is the aggregation of volumes of information emanating from many sources in the form of reports, staff estimates, plans and orders. An automated command and control (C^2) system is needed to provide a comprehensive, timely picture of the battlefield to support the decision making process. The Maneuver Control System (MCS) is such a system; it is a combination of computer hardware and C^2 software that gives the tactical commander quick access to near real-time battlefield information. Once a decision is made, MCS automates the preparation and distribution of orders via digital-burst transmissions, in milliseconds, to subordinate units for execution. A key feature of this program is its evolutionary implementation that began with an initial maneuver control capability in Europe in FY80. Both MCS software and hardware have evolved according to pre-planned, time-phased steps, guided by field user feedback from numerous exercises in Europe. During one Corps level MCS operational evaluation, a division commander attributed the successful execution of more than 20 brigade/battalion-sized counterattacks to the timely and comprehensive information provided by MCS. Over the next several years, MCS evolution will continue. The software effort will shift to operational refinements and doctrinal updates in FY86. The hardware configuration will evolve into a mix of fully militarized equipment for use in track vehicles and ruggedized nondevelopmental items (NDI) employed in less severe command post environments. As the system continues to evolve, its progress will be marked by periodic field evaluations. The next major evaluation is planned for January-February 1986 in Europe. The MCS will achieve initial operating capability in March 1986.



Maneuver Control System

Tactical Satellite Communication (TACSATCOM) systems support the ground mobile forces of the Army, Navy, Air Force, and Marine Corps by providing reliable and effective communications between widely dispersed and rapidly moving forces. Each of the systems uses a communications satellite as a relay station between terminals. Terrain is therefore less of a constraint for employment of TACSATCOM systems than for regular terrestrial systems.

Presently, one multichannel system and two single-channel systems are being fielded. The single-channel systems operate in the ultra high frequency range. Production of the single-channel Special Communications System, AN/MSC-64 which provides secure command and control communications from the National Command Authority to special weapons units worldwide was completed in 1983. In addition, a two-year production contract has been awarded for a single-channel UHF manpack for use by Special Forces and Ranger Units. Deliveries of the UHF manpack began in January 1984. The FY86 request will be used to purchase 136 sets. The Multichannel Initial System, AN/TSC-93A and AN/TSC-85A, provides tactical satellite communications down to brigade level. Production deliveries of these terminals will commence in FY85. Production of our antijam control modem to provide ECCM protection for this multichannel system will begin in FY85 continue into FY86

To meet the severe Electronic Warfare (EW) threat of the future, one single-channel and one multichannel Extremely High Frequency (EHF) system will be fielded. The Single Channel Objective Tactical Terminal (SCOTT) system will provide such a jam-resistant satellite communication link. Advanced development was completed in 1983. SCOTT is the Army ground terminal in the MILSTAR Satellite Communications System. The SCOTT program is being restructured and additional information will be provided when the revised program has been approved. The Defense Satellite Communications System (DSCS) is a worldwide military satellite communications system which supports the Worldwide Military Command and Control System (WWMCCS), the Diplomatic Telecommunications System, and tactical/strategic C^3I requirements of the Military Departments. The DSCS terminals are also compatible with and can use NATO military satellites. DSCS provides rapid deployment joint task forces with communications both within theater and on a worldwide basis. It is the only capability in existence to satisfy strategically critical wideband command, control, and intelligence communications.

The DSCS is a joint program with the Air Force responsible for the space segment and the Army for the ground subsystem. In the past few years, the Army has undertaken a complete upgrade and modernization effort that will result in the development, procurement, and worldwide installation of a new generation of large, medium, and small transportable satellite terminals. Many of these terminals will be equipped with digital communications and antijam equipment. A new automated system that will control the DSCS satellites in orbit, as well as communications that pass through the satellite, is being developed.

In support of the DSCS, the Army completed procurement of 32 AN/GSC-49 satellite terminals in FY84 for the Jam-Resistant, Secure Communications (JRSC) program. The JRSC will support the Tactical Warning and Tactical Assessment System (TWTA), WWMCCS, and the National Command Authority during enemy jamming or periods of highly volatile world conditions. Procurement of 12 Satellite Communications medium terminals with FY85 funding will provide essential improved capabilities for the DSCS system. This effort will continue into FY86.

The NAVSTAR Global Positioning System (GPS) is a satellite-based radio position navigation system that provides users with rapid data about position, velocity, and time. When fully deployed, the system will consist of 18 satellites and thousands of user terminals.

GPS employment includes units that normally operate at great distances from their home bases, such as cavalry, pathfinders, and Special Forces, as well as selected users to include all Army aircraft throughout the theater Army. It will also serve as an "initializer" for other position/navigation systems.

The joint GPS Program Office is staffed by Army, Navy, Air Force and NATO personnel, with the Air Force as lead. The Army is participating in the joint development of a family of manpack, vehicular, and aircraft user terminals. Testing of the first Army user terminals began in 1984.

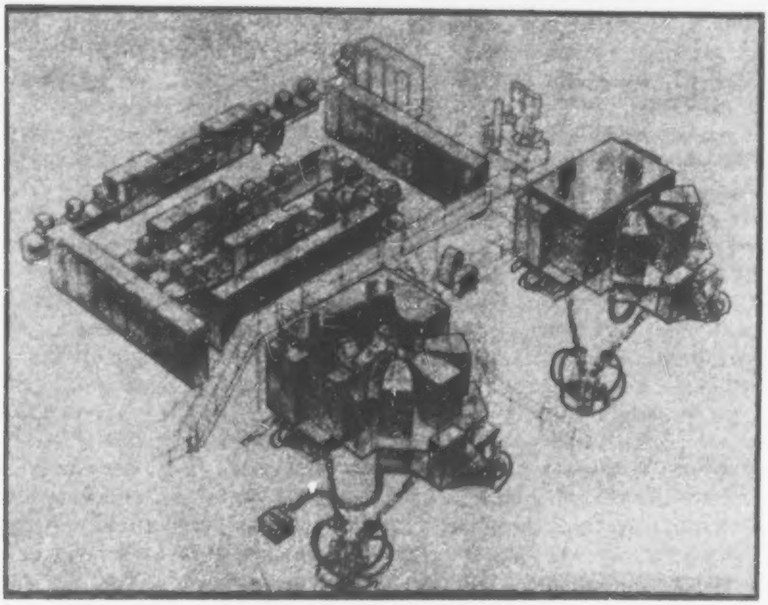
TRAINING SIMULATORS

The FY86 request reflects the Army's continued commitment to the increased use of simulators. We are aware that a future Army, with all the new weapon systems we are developing, cannot train to fight on the next battlefield without them.

While training with real equipment gives soldiers and their leaders confidence that it will work in combat, training with simulators allows soldiers to repetitively practice techniques which, if performed on the actual equipment or with live ammunition, would be too hazardous, too time-consuming, or too expensive. These training devices are used in conjunction with the actual system to provide the Army with the capability to maintain and improve the combat readiness of soldiers, crews and weapon systems, to reduce training and operating costs, to conserve scarce resources such as fuel, weapons, and ammunition, and to teach skills not attainable with operational equipment (i.e., maneuver and shoot without being killed). Training technology, much of which employs videodisc, computer-generated imagery, or lasers, is a US strength which is being exploited to insure that American soldiers and their leaders can shoot, operate and maintain their new equipment as close as possible to its capabilities.

Training devices and training simulation produce force multipliers that enhance combat effectiveness at a lower training cost. The combat effectiveness of Army personnel is key to both compensating for the numerical superiority of opposing forces and for maintaining a ready force. This combat effectiveness can best be achieved by innovative, efficient, and results-oriented training. The major thrust in the development of new training devices is to develop equipment that allows a high transfer of knowledge and experience from the training situation to a combat situation.

The Army's past investments in research and development of training devices are coming to fruition in FY86 as numerous devices enter or continue in the production phase. Among these devices are the Remoted Target System, which is the target mechanism component of the Army's Range Modernization Program; the Army Training Battle Simulation System, which is a computer driven war game for combined arms operations training of battalion level commanders and staffs; the Unit Conduct of Fire Trainer, which is a gunnery trainer for Abrams Tank and Bradley Fighting Vehicle crewmembers; the Multiple Integrated Laser Engagement System (MILES) for M1/M2/M3, which is a family of eye-safe laser devices that



Flight Simulator Complex

are attached to weapons to realistically simulate the firing capabilities of rifles, machine guns, and other direct fire weapons. The MILES will instantly simulate the casualty-producing effects of direct fire weapons providing a capability to conduct force-on-force tactical engagement simulation field exercises with enhanced realism and feedback to teach lessons heretofore learned only in actual combat. Other simulators just as important to train soldiers are the Air Ground Engagement System, which is MILES for aircraft and air defense weapon systems and Flight Simulators, such as the Combat Mission Simulator for the AH-64. Weaponeer, which uses a scaled-down mock range and high intensity light coupled with a microprocessor and monitor to teach soldiers basic rifle marksmanship, began fielding in FY83 and will continue through FY86. The flight and weapons simulation for the AH-1 Cobra was dedicated at Ft Campbell in January 1985.

This budget reflects the Army's commitment to provide realistic tactical engagement training to the combined arms by funding efforts to simulate indirect fire and expand MILES use to more types of weapon systems. Fielding MILES for ground direct fire, aircraft, and air defense weapon systems has provided unparalleled opportunities for realistic, two-sided, tactical training worldwide. We have added money in FY86 to provide the National Guard with additional sets of MILES.

Also included in this budget are efforts to achieve long-term economies and to improve the maintenance of proficiency through the use of microprocessors and lasers to provide precision simulation in lieu of live fire. The Army has a continuing need to expand the technology base for training devices and simulation to support the development of training environments and training systems that provide the training required to win in any conflict.

CONCLUSION

The FY86 budget request provides a balanced program to equip the Army. It doesn't attempt to outproduce the Soviets, but it does strive to insure that our units have the equipment they are authorized, and that our soldiers are equipped with weapons and equipment that are as good as the Soviets'--and in many cases better than the Soviets'.

Because of the research and development efforts during the 1970's, we are ready to field many of the new weapons and equipments our soldiers need. However, in order for us to provide our Army with the capabilities that we have described, we need continued strong Congressional support. Our new systems will only make a difference if they are in the hands of our troops on the battlefield. We also need your continued support of our RDTE programs.

With your help and support, we will provide our Army with what is needed in order for it to be ready should it be called upon to protect this nation's vital interests.

[Questions submitted by the Senators of the Senate Armed Services Committee to be answered for the record follow:]

QUESTIONS SUBMITTED BY SENATOR BARRY GOLDWATER

DIVAD TESTING

Senator **GOLDWATER**. What is the status of the additional testing that was ordered last year?

General **WAGNER**. Follow-on Evaluation I (April-May 1985) is designed to evaluate how well SGT YORK can protect its supported forces in as realistic a combat environment as possible. The evaluation will consist of a force-on-force maneuver phase, a tracking test, and live firing at ground and aerial targets. Currently, the test battery is in the final training stages at Fort Bliss, Texas. All plans have been finalized for the conduct of tests at both Fort Hunter-Liggett, California and White Sands Missile Range. Resources have been identified and are currently being located and configured at the test locations. At this point, there are no anticipated problems that will significantly impact on or delay the evaluation.

DIVAD

Senator **GOLDWATER**. What alternatives exist to provide our ground forces with an anti-aircraft gun?

General **WAGNER**. There are no near-term gun alternatives to Sgt. York. As part of the Army evaluation of alternative systems to Sgt. York, nine gun systems were looked at. Each system was screened against operational criteria, date of initial operational capability, logistic supportability for the test, and cost. No gun system made the final candidate list.

Senator **GOLDWATER**. How is the Army going about evaluating these alternatives?

General **WAGNER**. Twenty-six systems (guns, missiles, and hybrids) were initially screened against operational criteria, date of initial operational capability, logistic supportability for test, and cost. The Improved Chaparral as identified as an alternative system and will be evaluated in the same operational environment as the Sgt. York Follow-On Evaluation I. The Army will also undertake to acquire, for nonfiring limited test, representatives of two classes of systems (gun/missile hybrid and beam rider missile systems) which might be a replacement for, but not a near term alternative to Sgt. York. The short reaction time need for a gun contribution is well documented, as is the need for gun-missile mix on the battlefield. Of course, this limited testing cannot lead directly to any programmatic decision. Instead, the data can help draft sensible competitive requirements for a follow-on air defense system should that become necessary. The Army will attempt to execute this testing at a different location in order to have as large a data base as possible available.

Senator **GOLDWATER**. What is the projected cost of modifying and equipping the Divad and Stinger missiles?

General **WAGNER**. The projected cost of the Sgt. York (Divad)-Stinger integration is $957.8 million (including the cost of the Stinger missiles).

	Fiscal year—				
	1986	1987	1988	1989	1990
Sgt. York:					
RDTE	37.2	16.8			
PROC		64.9	141.3	83.7	22.3
Number of kits		75	295	244	
Stinger:					
PROC	45.4	149.3	154.7	153.4	88.8
Number of MSLS	530	2,056	2,158	2,158	1,178

Senator **GOLDWATER**. In your proposal, is the Stinger integrated with the fire control system, or is it simply "strapped on"?

General **WAGNER**. The Stinger missile will be intergrated into the Sgt. York (Divad) fire control system.

Senator GOLDWATER. What additional expense will be required to upgrade the ECM capability of the Divad's radar?

General WAGNER. An effort has been underway since October 1984 to identify radar and system improvements needed to counter the ever increasing ECM threat. The initial phase of this effort has concentrated on better defining the projected threat parameters and prioritizing the various type threats based on probability of occurrence. Testing against these threats will be included in both the fiscal year 1985 Initial Production Test and Follow-On Evaluation I. A final definitization of requirements, to include a cost estimate, will not be available until the fiscal year 1985 test results have been evaluated.

Senator GOLDWATER. What progress has been made in resolving software integration problems with the system?

General WAGNER. The largest number of software problems were encountered during the intergration and checkout of the first production unit. The number and extent of software changes have been decreasing as the fire units progressed through acceptance tests, Design Verification Test, Limited Test, and Initial Production Test. Recent software changes represent relatively minor performance refinements.

Senator GOLDWATER. What progress has been made toward eliminating the false target problem?

General WAGNER. Over the past year, several improvements have been made in the radar to reduce the false alarm rate. The detection thresholds and logic have been optimized and the frequency stability has been improved. During the Design Verification Test, the system met the false alarm rate requirement and during Limited Test, false alarms had a minimal impact on the system's ability to engage multiple targets. The ongoing Initial Production Test and the upcoming Follow-On Evaluation I will further evaluate the effects of false targets on the sytem.

LIGHT HELICOPTER FAMILY [LHX]

Senator GOLDWATER. Dr. Sculley, the Army proposed to develop a new helicopter (the LHX) to perform Scout, Utility, Tactical and Light Transport missions. The program is estimated to cost more than $30 billion. Have the requirements for the LHX been firmly established and agreed upon?

Dr. SCULLEY. A Letter of Agreement (LOA) between the material and combat developers has been prepared. The LOA specified the nature and characteristics of LHX. The final requirements document, the Required Operational Capability (ROC) will be prepared to support the Full Scale Engineering Development phase of LHX and will be completed in 1986 following the cost and operational effectiveness analysis.

Senator GOLDWATER. What speed is specified in the requirements document?

Dr. SCULLEY. The LOA calls for the LHX Scout/Attack (SCAT) cruise speed to be at least 170 knots at 4,000 feet, 95 degrees Fahrenheit at its primary mission gross weight. The utility version will be required to cruise at a speed of at least 160 knots under the same conditions.

Senator GOLDWATER. What if any consideration have you given to developing variants of existing helicopters—such as the UH-60 or the AH-64—to perform some of the missions intended for the LHX?

Dr. SCULLEY. Modifications to the existing light fleet as well as UH-60 and AH-64 variants are considered alternatives for LHX and will be included in the LHX Cost and Operational Effectiveness Analysis (COEA). Commercial Derivatives and foreign designs were explored early in the analysis, however, none which would justify the LHX requirement have been identified.

Senator GOLDWATER. Would such an approach simplify the design requirements of the LHX?

Dr. SCULLEY. Because of the wide disparity between the UH-60 and AH-64 helicopters and the LHX program goals and requirements, variants of these helicopters would not simplify the LHX design task. A derivative design approach tends to sacrifice many key LHX objectives, e.g., SCAT and Utility commonality, survivability, weight, Reliability Availability Maintainability (RAM), performance, reduced Operations and Support costs (O&S), transportability and self-deployability. Current fleet modifications to meet LHX requirements would lead to a virtually new aircraft. AH-64 and UH-60 helicopters are more expensive than the projected LHX in procurement cost, O&S costs and manpower requirements.

Senator GOLDWATER. What would be the likely result of such an approach on the overall cost of the program?

Dr. **Sculley**. In the long run, such as approach is likely to be more expensive than an LHX new development. It would sacrifice commonality between the Scout, Attack and Utility versions, reduce competition, have lower RAM characteristics and higher O&S cost.

Questions Submitted by Senator Strom Thurmond

120MM TANK AMMUNITION

Senator **Thurmond**. General Wagner, you stated that we will have [deleted] of ammunition for the new 120mm main gun on the M1 tank before we send those tanks to Europe. Will our allies have [deleted] of ammunition at that time?

General **Wagner**. Using our current rates for forward deployed M1A1 tanks in Europe, our [deleted]. Our allies will exceed this number of rounds for their 120mm tanks by fiscal year 1989.

ARMY TACTICAL WARFARE

Senator **Thurmond**. General Wagner, what is the status of the replacement for the Light Antitank Weapon?

General **Wagner**. The Army is currently conducting developmental and operational testing of the M72E4 Improved Light Assault Weapon (LAW) and the Swedish AT4. Testing will be completed in May for the M72E4 and in July for the AT4. Upon completion of testing, an In-Process Review (IPR) is scheduled for August 15, 1985 to decide whether or not to type classify the M72E4. The IPR will also decide whether or not to acquire the AT4, and if so, in what quantities.

TOW II

Senator **Thurmond**. General Wagner, at a briefing yesterday, [deleted].

General **Wagner**. Yes, the Army assessment is that [deleted].

BRADLEY FIGHTING VEHICLE

Senator **Thurmond**. The Hellfire Missile has proven to be a very effective antiarmor weapon. Why doesn't the Army put the Hellfire Missile on the Bradley Fighting Vehicle instead of the TOW II?

General **Wagner**. The Hellfire was initially considered for the Bradley along with TOW and other missile systems. Hellfire was determined to be a highly effective system, however, a human factor evaluation based on the size and weight of the missile precluded its use in the Bradley and the TOW was selected. The TOW has proven to be an excellent choice and it also provides the commander with flexibility in that he has a system that is not dependent on a laser designator for missile guidance.

To put the Hellfire on the Bradley now would necessitate a significant development program, configuration changes to the vehicle, and major ILS revisions.

CHAPARRAL

Senator **Thurmond**. Dr. Sculley, it is my understanding that the Army plans to let production of Chaparral stop and then start production again at a later date to procure Chaparral for the Reserve components.

Is this the case?

What added costs will be a result of the break in production?

Dr. **Sculley**. The Chaparral production line has been closed since January 1984. The last Chaparral buy was in 1981 for 32 fire units, with deliveries completed in January 1984. The production line is scheduled to start up again in July 1985 to support Foreign Military Sales (FMS) of 50 fire units plus the FY85 buy of 12 fire units for Army National Guard Modernization. FMS will pay for the production line restart. Deliveries will be completed in December 1987. An additional buy of 122 Chaparral fire units is programmed starting in FY89 for the Army National Guard. The cost associated with restarting the production line in this case is approximately $7.4M, assuming FMS does not keep the line open in the interim.

SGT. YORK

Senator **Thurmond**. Dr. Sculley, one of the original requirements for the DIVAD was a capability to engage high performance aircraft.

Is this still a requirement?

Dr. SCULLEY. Yes. Sgt. York is designed to provide air defense protection for the forward maneuvering forces of our heavy division against both high performance fixed wing and rotary wing aircraft.

INTEROPERABILITY OF COMMUNICATIONS SYSTEMS

Senator THURMOND. General Wagner, interoperability of our equipment with the other U. S. Services and our allies is very important to battlefield success.

Are our new family of communications systems capable of such interoperability?

General WAGNER. Yes, the Army is committed to achieving interoperability of its new communications systems with those of its allies and other U.S. services. We are heavily involved in the development of technical interface standards which specify functional, physical and electrical interfaces between different tactical C3 systems or equipment and the development of procedural interface standards that specify the manner of exchanging information between users across an interface. I would like to address the issue of technical standards.

Within the United States, technical interface standards are governed by the MIL-STD-188 series standards. Standards for tactical systems are developed by the services together under the Tactical Communications Technical Standards (TCTS) program. The Army recently transferred responsibility for this program to the Joint Tactical C3 Agency. The Services also work together to develop standards for strategic systems through the Standards for Long Haul Communications (SLHC) program. The efforts of both programs are coordinated by a Joint Steering Committee (JSC) to ensure that the standards are compatible and permit interface between tactical and strategic systems. There are 27 efforts currently underway to either develop new standards or revise existing ones as a result of technology changes.

The Army recognizes the importance of keeping Joint standards in line with allied standards by providing delegates to NATO and other international forums dealing in the same issues. Within NATO, this group is the Tri-Service Group on Communications-Electronics Equipment. As a result of our participation in the NATO forums, we have successfully developed, implemented and tested standards with other services and allied systems. The major systems shown below are examples of designing equipment that specifically meet interoperability criteria: AN/TTC-(TRI-TAC circuit switch; AN/UXC-7 (Lightweight Digital Facsimile); ANDVT (Advanced Narrowband Digital Voice Terminal); and AN/TYC-39 (TRI-TAC Message Switch).

AN/GRC-193A/213/PRC-104A (Family of Improved High Frequency radios).

SINCGARS (Single Channel Ground and Airborne Radio Systems).

NOTE.—At this time there is no STANAG for frequency hopping radios but SINCGARS will at present interoperate with NATO single channel radios. (Secure and nonsecure modes).

AN/GRC-215, TRC-179(V)1 (Regency Net of HF Terminals).

UNFUNDED EQUIPMENT REQUIREMENTS FOR RESERVED COMPONENTS

Senator THURMOND. Dr. Sculley, would you submit for the record what the Army considers the highest priority unfunded equipment requirements for the Guard and Reserve?

Dr. SCULLEY. In the Army National Guard, air defense and communications equipment are the most critical equipment shortfalls. The Department of the Army includes equipment for the Army National Guard in the Total Army budget. The procurement data in the fiscal year 1986 President's Budget P-1R reflects new procurement items that are currently planned for distribution to the Army National Guard from the President's Budget. The fiscal year 1986 P-1R exhibit reflects air defense and communcations equipment for the Army National Guard as follows:

Air Defense

Chaparral (new)—$19.4 million.
Chaparral (mod)—$20.8 million.
HAWK (mod)—$12.4 million.
Stinger (new)—$83.6 million.

Communications

All types (new)—$143 million.

The most critical items which are not funded in the budget for the National Guard amounts to almost $9 billion. The most critical shortages are in air defense, communications, aircraft, artillery, personnel carriers, trucks, and medical equipment. There are no critical items which do not receive funding to some degree in the budget. The Army is aware of the need for these critical items within the Army National Guard and is resourcing within the funding limitations based on the policy of "first to fight is first to be equipped." In the Army Reserve, major unfunded equipment shortages with respect to wartime requirement include the following:

[Dollars Short]

Item	*(Millions)*
Aircraft (all types)	$90
Tactical ADPE	22
Tanks (all series, includes Training Division needs)	1,542
Trucks	323
Artillery	42
Radars	16
Carriers/other tracked vehicles	175
Communications equipment	132
Other equipment-engineer, trailers, generators, shop sets, test, measurement and diagnostic equipment, et cetra	743
Total	3,085

Each of the Army Reserve's areas of critical equipment shortfall is funded in the fiscal year 1986 budget to the degree possible within the total Army resource limitations. Coupled with deliveries funded by previous procurement appropriations, and equipment to be displaced from the active component to the Reserve Components, the Fiscal Year 1986 Army Procurement budget will reduce Army Reserve equipment shortfalls in most critical shortage areas. The remaining unfunded requirements for high priority units consists primarily of equipment in the category listed as other to include engineer equipment such as cranes, pile drivers, tractors, trailers and related items. The list also includes selected trucks, for example, 20 ton dump trucks and concrete trucks, as well as watercraft, such as tubtboats and barges.

QUESTIONS SUBMITTED BY SENATOR JOHN WARNER

DIVAD

Senator WARNER. We have heard numerous reports regarding the Sergeant York Air Defense Gun and, of course, have observed the accounts in the media regarding this. In your opinion, General Wagner, is the leadership of the Army firmly behind this system?

General WAGNER. Yes, the Army is confident that the Sgt. York (Divad) Gun will successfully complete the fiscal year 1985 Initial Production Test and the Follow-On Evaluation I. With favorable test results, it is anticipated that the Department of Defense will continue the program.

Senator WARNER. If this program is terminated by the Congress, what alternatives are there to meet this requirement?

General WAGNER. Improved Chaparral, while not totally suitable because its use foregoes the valuable mix of guns and missiles, does provide a near-term alternative to Sgt. York. The Army is looking at two classes of systems (gun/missile hybrid and beam rider missile systems) as a possible long-term replacement to Sgt. York.

Senator WARNER. How do these other alternatives compare in costs?

General WAGNER. Improved Chaparral is already in the Army system and can be acquired for approximately the same cost saved by terminating the Sgt. York program at 146 fire units. The longer term replacement system (gun/missile hybrid or beam rider missile) acquisition cost would probably be $1-2 billion above what is saved by terminating the Sgt. York program at 146 fire units.

MULTIPLE LAUNCH ROCKET SYSTEM (MLRS) ROCKET MULTIYEAR BUY

Senator WARNER. Dr. Sculley, I am informed that the Army has been unable to exercise a second option following the 5-year multiyear procurement of MLRS rocket because of a ruling by the GAO regarding the legality of such options.

Further, it is my understanding that the government will incur considerably higher costs as a result of the GAO ruling. Would you give this committee your views on this situation?

Dr. SCULLEY. The Comptroller General issued a decision #B-215825, subject: Army's Multiple Launch Rocket System Multiyear Contract, dated Dec. 21, 1984, which recommended that the Army not exercise option 2 without specific enabling legislation. The matter of legality was not addressed in the decision, but the conclusion reached was that the Congress did not appropriate fiscal year 1985 funds with the full knowledge that they were to be used by the Army to procure Economic Order Quantity items for fiscal year 1989 end items. They therefore recommended that the Army seek explicit legislative authority before attempting to exercise option 2, which is to procure EOQ for fiscal year 1989 rockets. The Army is currently exploring ways to obtain the necessary explicit enabling legislation.

The impact of not exercising option 2 is as follows:

Advance Materials ($56.6M) for fiscal year 1989 rockets (30,510) will not be ordered unless we get specific enabling legislation.

There is no guarantee of Firm Fixed Price (FFP) of fiscal year 1989 rockets. Before the decision, option 2 assured fixed price to option 4 (purchase of fiscal year 1989 rockets).

Overall savings of the MLRS multiyear contract is reduced from $209 million to $179 million. ($30 million savings and cost avoidance is lost.)

LIGHT DIVISION

Senator WARNER. General Wagner, I have supported the Army's new light division initiative. Critics of the light division contend that you are designing the division in response to constraints imposed by the shortfalls in airlift which currently exist rather than in response to the threat. How do you respond to this criticism? Have you developed an operational concept for the light division? How will it be used in Europe? Could you briefly describe it?

General WAGNER. Army forces are designed to defend against the threat. The light infantry division is designed to defend against the threat. The light infantry division is designed to be deployable in about one-third the time needed by current infantry divisions because of the requirement for a creditable combat capability which is strategically responsive to crises, or as a pre-crisis measure, in a low to mid intensity environment. The operational concept for the light infantry division was published on 15 March 1984; this concept led to publication on 31 July 1984 of Field Circular 71-101, Light Infantry Division Operations. The concept addresses employment in low intensity conflict and includes possible employment in mid to high intensity conflict as will be found in war in Europe. The division is capable of negotiating all types to terrain, operating day, night, and in periods of limited visibility, in all geographic regions, and can quickly adapt to various modes of transportation. The division will fight an aggressive AirLand Battle. The division's capabilities are intended for maximum utility in low intensity operations; when the division is employed in such an environment, special augmentation such as trucks or combat vehicles are not required. Employment in an European scenario may require some augmentation such as reinforcing artillery, transportation and engineer units. In Europe the division would normally be employed in restricted terrain and given missions to retain that terrain; this will free heavier forces to operate in open terrain where they can make best use of their maneuverability and fire power.

Senator WARNER. Would you descibe the R&D programs you have initiated in support of the light division. What percent of your R&D spending is devoted to this effort?

Dr. SCULLEY. Research and development items are not designed in advance for a specific unit. Therefore, the Army is unable to state which will be procured for light division. All items under research and development have numerous applications and are not normally unique to one unit. For example, the British Light Gun, which is currently being tested, has application in the airborne as well as other infantry units as part of the Army's objective of lightening the force.

Senator WARNER. Dr. Sculley, I have supported the Army's new light division initiative. Critics of the light division contend that you are designing the division in response to constraints imposed by the shortfalls in airlift which currently exist rather than in response to the threat. What new light, lethal weapons do you envision for this division?

Dr. SCULLEY. The light infantry division will be equipped with Army standard weapons. The individual soldier's weapons (rifles, machine guns, grenade launchers, pistols) constitute the greatest quantity in the division. Other weapons systems include mortars (both 60mm and Improved 81mm), 105mm artillery, anti-tank missiles (TOW and DRAGON), and attack helicopters. Each of these weapons may be improved or upgraded as a part of an Army wide program. An example of such a possible improvement is the longer range British light field gun (105mm); this weapon will be tested by the Army for possible fielding in light forces. There are no weapons specially designed for the light infantry division.

MOBILE SUBSCRIBER COMMUNICATIONS SYSTEM

Senator **Warner**. I understand that the Army has a unique acquisition plan for its Mobile Subscriber Communications system.

a. Could you describe this acquisition plan and indicate the savings that might be generated through this plan?

b. Is it true that there is no testing required under this plan?

Dr. **Sculley**. a. Mobile Subscriber Equipment (MSE) is being competitively acquired using a nondevelopment item (NDI) acquisition strategy. The basic objective of this strategy is to capitalize on sources of equipment that are existing and currently in production. The Army plans to obtain a fixed price for the entire quantity required while in the competitive environment, awarding a firm fixed price contract with five price option years. Other key features include incorporation of a performance warranty with payment reduced until the system is accepted in the field, and a requirement, while in the competitive phase, for the contractor to guarantee availability and price for spare parts for 15 years after last system delivery.

Purchasing MSE using the NDI acquisition strategy eliminates the need for a time-consuming and expensive research and development program prior to entering into production. Since it is difficult to accurately estimate the cost of this development program, information has been obtained on the actual costs incurred during the 1970's for the development of an existing foreign system. A foreign army spent approximately $200 million in the 1970's for its system. The development of a new system starting now is estimated to cost approximately $500 million. However, cost is not the only savings with a NDI approach. NDI also saves time. Procuring an existing system will provide a significantly improved communications capability at a much earlier date. To include the latest technology, the Army would have to embark on a developmental program that would take a minimum of 4 years. Thus, the Army can buy what is available now and meets our requirement and save money and time.

b. No, the NDI strategy includes several phases of testing. The NDI approach envisions competition between existing systems that are available for acquisition at the time of contract award. These existing systems have already been subjected to extensive testing.

The strategy requires each offeror to demonstrate his system to an Army evaluation board prior to contract award. They are required to show that their systems perform according to specifications and comply with the functional requirements of the Army.

In addition, the system must pass an in-plant product assurance test as well as a final acceptance test at the field location. Significant payments are withheld until after successful completion of the final test. All elements will be covered by warranties.

NIGHT VISION

Senator **Warner**. You indicated that there would be increased numbers of night vision devices in the light divisions. The acquisition plan for these devices, however, has been recently characterized by turbulence and lack of coherence. When will this program be brought under control and requests for proposal issued?

Dr. **Sculley**. The night vision program has been brought under control during the past six months through improved management procedures and a new acquisition strategy for night vision devices. A Project Office for Night Vision has been established to direct and control research, development and acquisition of image intensification (I^2) night vision devices. The acquisition strategy combining all I^2 devices into a 5-year multi-year procurement plan has been completed. The requests for proposal will be issued on March 13, 1985.

QUESTIONS SUBMITTED BY SENATOR GARY HART

ARMY TACTICAL WARFARE

Senator HART. General Wagner, does the Army at this time have a requirement for a light antitank weapon—a weapon to kill tanks at ranges of 250 meters or less?

General WAGNER. Current Army combat doctrine does not require an individual soldier to attack tanks from the front with LAWs. This task will be accomplished with Medium and Heavy Antitank Weapons. The lightweight requirement is for a Light Assault Weapon for use against lightly armored vehicles and other materiel targets, including possible use as a weapon of last resort against the sides and rear of tanks.

Senator HART. General Wagner, does the Army currently have in inventory an effective light anti-tank weapon?

General WAGNER. The M72A3 LAW currently in the inventory has not met the Army's desired performance characteristics. For this reason we are developing the product-improved M72E4 and are also testing the Swedish AT4.

Senator HART. If not, by when does it expect to have such a weapon in inventory?

General WAGNER. An In-Process Review (IPR) is scheduled for August 15, 1985 to determine whether or not to type classify the M72E4 Light Assault Weapon. The IPR will also decide whether or not to buy the AT4, and if so, in what quantities. In either event, the weapon or weapons selected will be delivered beginning in the first quarter of fiscal year 1987.

Senator HART. General Wagner, what is the status of the Swedish AT4 weapon, in terms of Army plans to purchase it?

General WAGNER. The AT4 is currently undergoing developmental and operational testing. This testing is scheduled for completion in July 1985. An In-Process Review (IPR) will be held August 15, 1985 to decide whether or not to purchase the AT4, and if so, in what quantities.

Senator HART. General Wagner, what evidence does the Army have concerning the behind-armor effects of the AT4? Does it plan to test the AT4 by firing it at actual tanks that have fuel and ammunition on board and the hydraulic system pressurized?

General WAGNER. Earlier this year the Army conducted tests at Aberdeen Proving Ground to determine the behind-armor effects of the AT4. Both static and dynamic tests were conducted. The results of these tests are still being evaluated. The Army does not plan to test the AT4 against operational tanks.

Senator HART. General Wagner, if the Swedish AT4 does not perform satisfactorily in tests, when does the Army anticipate it will have an effective light anti-tank weapon in inventory?

General WAGNER. An In-Process Review (IRP) scheduled for August 15, 1985 will determine whether or not to type classify the M72E4 Light Assault Weapon. The IPR will also decide whether or not to buy the AT4. In either event, deliveries of the weapon or weapons selected will begin in the first quarter of fiscal year 1987.

QUESTIONS SUBMITTED BY SENATOR CARL LEVIN

M1 TANK

Senator LEVIN. General Wagner, is the M1 tank still a top procurement priority for the Army?

General WAGNER. The M1 tank still remains the Army's top procurement priority.

Senator LEVIN. General Wagner, do the force structure changes and modification to the unit structures of the Army currently underway—including creation of the light divisions and changes to the Division 86 structure—alter the Army's requirements to modernize its heavy units? Has the Army adjusted any of its procurement programs to reflect these changes? In the case of the M1, do these changes require any alteration in the total planned procurement program? If not, why?

General WAGNER. Army force structure changes and modification to unit structures have in no way altered the Army's requirement to modernize its heavy units. The Army has not adjusted any of its procurement programs as a result of force structure changes. Planned procurement for the M1 series tank remains 7467 units. The number of tanks in an M1 tank battalion remains the same with the same number of active and reserve component tank battalions requiring the M1 tank.

Senator LEVIN. General Wagner, the performance of the M1 in the annual large scale NATO combat exercise—Reforger—in the past two years has been excellent.

Reforger '84 has just concluded, and we have received preliminary information that the M1 continued its fine performance record. Please provide detailed information for the record as to how the M1 performed in Reforger '84.

General **Wagner**. 333 M1 tanks participated in Reforger '84 and maintained a readiness rate of 96.7% for the duration of the exercise. These tanks averaged 331 miles of use for Reforger. 108 of the tanks were drawn from Prepositioned Overseas Material Configured in Unit Sets (POMCUS) by a deploying FORSCOM brigade and 225 belonged to USAREUR based participating units.

Senator **Levin**. General Wagner M1 tank crews also reportedly performed well in a major NATO tank gunnery exercise known as the Canadian Army Trophy. Please provide details for the record.

General **Wagner**. The Canadian Army Trophy tank competition has been conducted biannually since 1963 at tank ranges in the Federal Republic of Germany. The 1983 competition, the most recent event, was hosted by the Canadian Army at Bergen, West Germany, from 20-24 June 1983.

The 1983 competition had a significant change in that Army Groups within the Central European Command competed against each other. New rules were designed to overcome past practices in which the original aims of the competitors were distorted into nation versus nation or tank versus tank. The 1983 competition had no national or tank type winner.

No awards were given to companies in an attempt to lessen tank or nation comparisons. However, had company awards been given, the U.S. would have swept overall high, Central Army Group (GENTAG) high and Northern Army Group (NORTHAG) high. The Germans won honors in the platoon level competition.

Results were as follows:

Army Group Winner—CENTAG.
Platoon winner—GE 293d Tank Bn.
  2d and 3d overall—U.S. 3d Bn-64th AR (M1 tanks).
Company results (not a competitive category in 1983).:
  High overall—U.S. 3d Bn-64th AR (M1 tanks).
  High CENTAG—U.S. 3d Bn-64th AR (M1 tanks).
  High NORTHAG—U.S. 2d Bn-66th AR (M60A1).

Senator **Levin**. Some consideration is being given to initiating 4 year, multiyear procurement contracts for the main body of the M1 engine and fire control system. Initial reports are that a multiyear contract for the main M1 chassis could save significant sums of money. How much can be saved? Has OSD approved this multiyear proposal? What fiscal and military benefits would result? Please provide details for the record.

General **Wagner**. The Army has submitted a proposal to initiate a 4-year (fiscal year 1986-89) multiyear procurement for four M1 components. The chassis is one. It is estimated that a multiyear contract for the M1 Tank chassis will save approximately 10 percent (nearly $400 million) when compared to the present process of negotiating single year contracts on an annual basis. The multiyear proposal is currently being staffed at OSD.

Senator **Levin**. What other advantages are there to this proposal?

General **Wagner**. An M1 multiyear procurement could, in addition to cost savings, generate benefits in stabilizing production, increasing production capacity without additional government investment, provide incentive for vendors to train and employ permanent employees and improve vendor skills. The total estimated savings reflected on the M1 multiyear procurement exhibits is greater than $600 million. The M1 program just completed a multiyear contract (fiscal year 1983-85) on the fire control system which generated savings of $130 million and we would like to employ the same procurement strategy to save another $600 million during the next 4 years.

BRADLEY FIGHTING VEHICLE

Senator **Levin**. Questions continue to be raised about the survivability of the Bradley Fighting Vehicle. The Army plans to increase its survivability, but those improvements reportedly will not be introduced into the vehicles for several more years. What survivability enhancements is the Army planning to incorporate into the Bradley and when will they be installed? If installation will not begin for several more years, what accounts for this delay? Can the schedule for implementation of these improvements be accelerated, and how much would it cost to accelerate that by 1 year: By 2 years?

General **Wagner**. I would like to take this opportunity to advise the committee that the technology required to allow light combat vehicles to defeat shaped charge weapons was not known when the Bradley was developed. In fact, even the development of a heavier vehicle would not have solved the problem of defeat by all shaped charge weapons. Accordingly, the Bradley was designed to defeat 92 percent of the weapons expected to be encountered on the battle field, and has successfully demonstrated that it is capable of doing so. Now that we have developed the technology to defeat some shaped charge weapons we are studying its application to the Bradley as part of our survivability studies. The Army's plans to increase the survivability of the Bradley are being accomplished by increasing the level of armor protection and by using interior stowage and protective techniques which will decrease the probability of catastrophic damage is a penetration occurs. Current plans are to incorporate these changes into the fiscal year 1989 procurement program. High payoff individual changes, which are identified as beneficial from the Ballistic Research Laboratory Bradley survivability shooting, will be cut into production at the earliest possible date.

Acceleration of this program is not recommended. The program as laid out will ensure that changes to BFVs will do the job, be cost effective, and not degrade current performance. Acceleration would require a redefinition of the scope of work and could create further delays due to administrative cycle requirements. Adherence to this schedule depends on full funding for the development effort.

LIGHT DIVISION INITIATIVES

Senator LEVIN. The Army's budget request contains funds for the following programs, all of which are designed for fielding in light divisions:

$15 million in procurement funds for test launchers for Stinger missiles for use at the 9th Motorized Infantry Division at Fort Lewis;

$81 million in R&D funds for the Advanced Anti-tank Weapon System (to replace the Dragon man-portable anti-tank missile);

$10 million in R&D funds for the M551 Sheridan tank update which has been designated for the role of the Mobile Protected Gun;

$3 million procurement funds for Fast Attack Vehicles (militarized dune buggies) for the 9th Motorized Division;

Funds to lease 105 millimeter towed howitzers from the United Kingdom to test their feasibility for use in light divisions.

All these programs represent the first phase in major potential investments in equipment for light divisions. Is there a coordinated plan for fielding these items in all light divisions or are these one-of-a-kind specialized programs? Why should we proceed on a haphazard basis buying equipment for light divisions in the absence of an overview plan for equipping light forces?

General WAGNER. The basic premise of your statement that all of the systems you outlined were designed for exclusive fielding in the Army's light divisions is inaccurate. There are no plans to begin a major investment program to develop new equipment specifically designed for the new Light Infantry Divisions. These divisions are being fielded with standard type-classified equipment. This has been the plan for these divisions from their inception.

For some years now the Army has conducted operational and organizational concept testing of innovative equipment designs at Fort Lewis, WA. As a result of these tests we are in the process of transitioning the 9th Infantry Division to a High Technology Motorized Division (HTMD). This division does utilize both standard and HTMD unique equipment.

The $15M in the Stinger Missile request you mentioned initiates a program to procure 51 Pedestal Mounted Stingers on a High Mobility Multi-purpose Wheeled Vehicle for the HTMD. After its initial fielding at Fort Lewis the Army also plans to field this system in the Reserve Component. The $3M requested for the Fast Attack Vehicle (FAV) will complete a program which began in fiscal year 1982 to field a total of 466 FAV's to the HTMD. There are currently no other requirements for the FAV other than the HTMD.

The fiscal year 1986 request also includes approximately $10M to begin the development of a new turret for the M551 Assault Gun. Our plan is to replace the current 152MM gun/launcher turret on the M551 with a low recoil 105 or 120MM gun turret. This system will be fielded in the HTMD to meet its requirement for an Assault Gun. This system could also replace the M551's in the Armor Battalion of the 82d Airborne Division.

The HTMD is also conducting concept tests this fiscal year on the 105MM British Light Gun. The Army is considering the replacement of its current 105MM howitzer with a longer range 105MM howitzer. If the tests are successful and the Army decides to request funding, a new howitzer would be fielded in the Airborne/Air Assault Divisions and the Light Infantry Divisions.

The Advanced Anti-Tank Weapon System-Medium which you mentioned Senator, is being developed to meet an Army-wide requirement for a follow-on to the Dragon Missile. This was an fiscal year 1985 new start for which Congress appropriated $24.8M. This is an urgently needed system which is supported in the Army's Anti-Armor Master Plan. It will be fielded in both the Army's heavy and light forces.

DIVAD

Senator **Levin**. The Secretary of Defense in late September 1984 decided to delay the exercise of the third and last production option for the Sergeant York air defense gun until the completion of additional testing to be held in 1985. The justification for not exercising the option was the lack of demonstrated performance in testing.

Initial Production Testing—The Army planned to start initial production testing (IPT) in November 1984 and to proceed into extensive operational testing at the completion of production testing in the spring of 1985.

Based on the results of these two tests, it is expected the Secretary of Defense will make a decision to either continue procurement in fiscal year 1986 or cancel the program.

What is the status of initial production testing?

General **Wagner**. Initial Production Testing is currently ongoing at Fort Bliss, TX; Aberdeen Proving Ground, MD; and Electronic Proving Ground, AZ. The test is designed to demonstrate the the Sergeant York conforms to system specifications, as well as stated quality, performance, safety, reliability, and maintain ability standards, to include an electronic warfare test and evaluation. The test is scheduled to end in May 1985.

Senator **Levin**. What are the results of testing to date?

General **Wagner**. Four major areas of reliability are evaluated during Initial Production Testing (IPT): Armament, Fire Control, Power and Actuation, and Mobility. Contract specifications for armament are 1000 mean rounds between failure. IPT results of 3,500 rounds greatly exceeds the contract specifications. Contract specifications for fire control are 65 hours of mean time between failure. IPT results of 79 hours exceed the contract specifications. The contract specification for power and actuation is 100 hours of mean time between failure. IPT results of 46 hours do not currently meet the minimum, but the major hydraulic fault has been isolated and corrections are being applied. The requirement for mobility is 340 mean miles between failure. IPT results of 416 miles greatly exceed this requirement. Performance testing has revealed that detection of ingressing fixed wing and helicopter targets and ground firing hit probability looks good; reaction times are close to the required level and should provide an acceptable capability in an operational evironment. In general, the Army does not see any show stoppers at this time.

Senator **Levin**. It is our understanding that the contractor is to correct design or performance defects disclosed during IPT, at no cost to the government. What responsibility for correcting such defects disclosed in operational testing, which follows IPT, does the contractor bear?

General **Wagner**. The Physical Configuration Audit (PCA) is scheduled to follow IPT and FOE I. The PCA will verify that the production version of the Sergeant York system matches approved and released design documentation requirements. The contractor is liable to correct any defects in functional performance discovered during Initial Production Test and Follow-on Evaluation I that do not meet design specifications.

Senator **Levin**. Elements within the Department of Defense questioned the performance of the fire unit during limited operational testing conducted this past summer at Fort Bliss, TX. Specific operational weaknesses of the air defense gun were its response time to engage aircraft, its accuracy to shoot down aerial targets, its radar performance in an electronic countermeasure environment and its reliability to perform without constant subsystem breakdown. What problems or deficiencies were exhibited during the limited test?

General **Wagner**. The Sergeant York Limited Test results were good considering the limited resources available and the short duration of the test. One concern coming out of the test was system reliability which did not move as close to the growth curve as expected. This was not surprising since the systems were very early production hardware, tested before there was a chance to shake out start up bugs. False targets had a minimal impact on operational performance. Hovering helicopter engagement was low in both benign and electronic countermeasure environments. We believe that this was due in a large part to instrumentation problems caused by test site geometry at one fire unit test location. Reaction times were close to the required level and will provide an acceptable capability in an operational environment. The Cost and Operational Effectiveness Analysis (COEA) indicates that a median reaction time of 16 seconds would normally be sufficient to defeat the threat. Test data is showing that Sergeant York reaction time will be under 16 seconds.

Senator Levin. How critical are they in terms of limiting operational capability?

General Wagner. The Limited Test results did not reveal any critical area that would critically lower operational capability. Based on the test results, the Army's independent operational tester concluded that "the observed performance of the system, operated by soldier crews, supports the estimate of performance which led to the initial decision of initiate the materiel acquisition process."

Senator Levin. What is being done to correct these problem areas or deficiencies?

General Wagner. The contractor is required to correct problems and deficiencies noted during the Limited Test. Required fixes have been incorporated into the production hardware. The ongoing Initial Production Test (IPT) will evaluate how well the Sergeant York conforms to system specifications, as well as stated quality, performance, safety, reliability and maintainability standards, and meets electronic warfare test and evaluation criteria. Following IPT, the Follow-On Evaluation I will evaluate how well the Sergeant York can protect its supported forces in as realistic combat environment as possible. Any problems noted during these tests are covered under the warranty provisions of the contract and will be fixed by the contractor within the ceiling price of the contract.

Senator Levin. What are the Army's plans for assuring that the upcoming operational test in the Spring of 1985 is sufficiently realistic to permit a judgment as to Sergeant York's operational capability?

General Wagner. The Army is developing a comprehensive Follow-On Evaluation that will provide a rigorous, objective evaluation and analysis of the Sergeant York System to produce irrefutable data that the Secretary of Defense can use in making his decision on continuing the program. The test, scheduled for April–May 1985, will consist of a force-on-force and tracking phase at Fort Hunter-Liggett, California and a live fire phase at White Sands Missile Range, New Mexico. The force-on-force phase will be conducted 1–30 April to demonstrate the comparative ability of the Sergeant York-Stinger platoon (four Sergeant York systems) and a Vulcan-Stinger platoon to protect a maneuver battalion task force. A task force from the 2d Armored Division, using M1 Tanks and Bradley Fighting Vehicles, its complement of support units and other air defense assets (Improved Chaparral and Improved Hawk), will engage in offensive and defensive operations against an opposing tank/mechanized force supported by antitank helicopters and close air support fixed wing aircraft. The test will consist of a series of tactical scenarios. During these the task force will conduct delay, tactical road marches, offensive operations and point defense operations under a variety of battlefield conditions likely to be present at the time of the fielding of the Sergeant York System. These conditions include electronic countermeasures against the Sergeant York radars and communications systems. The tracking test will take place during the force-on-force phase to provide data for use in evaluating Sergeant York's probability of kill against air targets flying operational profiles. This test will consist of multiple flight passes, a portion of which will be conducted in an electronic countermeasures environment. The live firing phase of the test will be conducted 1–31 May 1985 at the Red Rio range of White Sands Missile Range. Firings will be conducted during daylight hours against full scale ground and aerial targets. Although some missions are designed to be conducted during conditions of limited visibility, safety requirements for the test site will dictate the level of limited visibility allowed.

AQUILA RPV

Senator Levin. The Army's Aquila RPV programs have been troubled by technical problems, schedule delays and escalating costs. Yet the Army rejects an alternative, saying it cannot meet specifications and will cost more than Aquila in R&D. A study projected that an existing generic system could be modified to meet Army requirements at a cost of development of $241 million compared to $136 million to complete the Army's present program. Also, the Army estimated the Initial Operational Capability date for the generic system would be 2 years later than for the Aquila program.

It is my understanding that the Army conducted this analysis without consulting the contractor responsible for this alternative system. If that is so, shouldn't the

Army consult that contractor before promoting an analysis which would eliminate that system from consideration?

General Wagner. The study was designed to evaluate a generic RPV that could meet Army requirements to the maximum extent possible. The study was based on data obtained from a variety of different contractors including Lear Seigler, Inc., AAI (Israeli Mastif and Scout), E-Systems, Boeing, Canadair, and Meteor SPA (Italian MARACH 20). The contractors were given unclassified Aquila requirements information and asked for an estimate of time and cost to satisfy the requirements. Not provided were classified requirements data largely satisfied by subsections already developed for Aquila which would be integrated into the generic system. The contractor proposals and engineering estimates for integration and other essential modifications were combined to give a cost and Initial Operational Capability estimate for a system that would approximate Aquila capabilities.

NEW ARMY HELICOPTER PROGRAM [LHX]

Senator Levin. In January 1985 the Army increased its requirement for LHX's by over 400 aircraft from previous estimates and substantially changed the mix of scout and utility aircraft as reflected below:

NUMBER OF LHX AIRCRAFT

	December 1984	January 1985	Difference
Scout/Attack	2,137	3,033	+896
Utility	2,408	1,915	−493
Total	4,545	4,948	+403

The LHX will possess capabilities far in excess of the aircraft it replaces but the Army plans to replace the old helicopters on a 1 for 1 basis with LHXs. No in-depth studies have been completed to demonstrate a trade-off replacement ratio of new aircraft for old, according to the GAO. Is the GAO allegation true?

Dr. Sculley. The General Accounting Office allegation is incorrect in that studies have been initiated to determine the exchange ratio between LHX and the aircraft it replaces on a unit-by-unit basis. The final LHX distribution will reflect the results of this analysis. LHX total requirements will center around approximately 5,000 aircraft with about 60% Scout/Attack and 40% Utility distribution.

Senator Levin. What was the basis for determining a need for 4,545 aircraft?

Dr. Sculley. The Army initial estimates for 4,545 aircraft was based upon "Division 86" force structure and the LHX Organizational and Operational Plan.

Senator Levin. What mission or other changes have been made to increase the scout/attack quantities by 896 and reduce utility by 493?

Dr. Sculley. The change in overall quantity mixes reflect a change to an Army of Excellence force structure which includes necessary attack, scout and utility requirements for aviation in new organizations. The final quantity of LHX aircraft will be determined from the Cost and Operational Effectiveness Analysis.

Senator Levin. Are the required quantities of LHX aircraft potentially overstated based merely on a 1 for 1 replacement without considering LHX capability?

Dr. Sculley. The system capabilities have been considered in making the replacement estimates and the LHX quantities have not been overstated. LHX will not replace the existing fleet on a one-for-one basis in every unit.

AQUILA RPV

Senator Levin. According to 2 OSD offices, Comptroller and Under Secretary for Research and Engineering, the Army reported to them at the end of fiscal year 1984 that one or more major problems continue to exist in 9 categories used to evaluate weapons systems, including overall system performance, cost, schedule, logistics, funding, etc. for the Aquila RPV. Do these problems continue to exist? Provide for the record specific rebuttal if the Army disagrees.

General Wagner. Problems have been experienced in the areas noted; however, the Army believes Aquila development is now progressing favorably and is confident that program objectives will be met. Aquila has flown a total of 120 test flights in Full Scale Development (FSD). Of these, only 11 failures have occurred; causes of these have been determined and corrective action taken. On 17 December 1984, Aquila successfully demonstrated its ability to designate for Copperhead.

During fiscal year 1984, technical problems effecting system performance caused the contractor to express doubt about his ability to meet a FSD program schedule of 70 months. This led the Army to conduct several in depth reviews of operational requirements and overall program strategy. As a result, the FSD program was extended to 79 months and program risk was reduced by eliminating plans for concurrent DT II and OT II.

Program costs have been reduced by limiting the program scope to address only absolutely essential mission requirements. Additionally, Aquila contractual strategy has been revised to hold the contractor accountable for minimum acceptable performance as a prerequisite for contract continuation as each respective phase within FSD and production is completed.

DIVAD

Senator LEVIN. According to 2 OSD offices (Comptroller and Under Secretary of Defense Research and Engineering), the Army reported to them at the end of fiscal year 1984 that major problems continue to exist in nine categories for the Sergeant York (Divad) gun, including unsatisfactory schedule and contract problems, and other major problems in production readiness, logistics and funding. Do these problems continue to exist? Provide for the record specific rebuttal if the Army disagrees.

General WAGNER. There were several major decisions in fiscal year 1984 that have significantly restructured the Sergeant York program. First was the Secretary of Defense decision to delay the fiscal year 1984 Option III award until completion of fiscal year 1985 operational testing. Second was the congressional decision, at the request of the Secretary of Defense, not to authorize fiscal year 1985 production and to limit fiscal year 1985 funding to $100 million for long lead items for a potential fiscal year 1986 procurement. As a result of the Secretary's decision, the production schedules for fiscal year 1982 Option I, fiscal year 1983 Option II and fiscal year 1984 Option III were extended to preclude a production break. These extensions were made at no cost to the Government. The congressional decision not to authorize fiscal year 1985 production has added another year of production (fiscal year 1988) with a resultant increase in program cost. Production is an area of concern due to the risk associated with meeting the increased monthly production rate which began in February 1985. The Army is working closely with the contractor to keep him on schedule. Logistics is a high risk area but this was recognized at the start of the program when the decision was made to defer the ILS development to the current phase of the program. This area is being intensively managed and the recent program restructuring will give us additional time to provide support equipment needed for training and fielding. The fiscal year 1985 test program is considered ambitious but achievable. Periodic scoring conferences and test readiness reviews are being held to monitor Initial Production Test progress and to review ongoing test preparation for the Follow-On Evaluation I and Alternative Systems Test. So far, there are no show stoppers. The Army is confident that these tests will be successfully completed. With favorable results, it is anticipated that the Department of Defense will continue the program. With this decision, the Army expects to see more stability in the program than we now have.

APACHE ATTACK HELICOPTER

Senator LEVIN. General Wagner, late last year, two branches of the Secretary of Defense's Office—the Comptroller and the Under Sec. for Research & Engineering reported that the second production contract for the APACHE advanced attack helicopter is far behind schedule and overrunning its target price by almost 20 percent. It was reported that the contract may be significantly underfunded.

Cost and schedule problems also were reported for the logistics and support hardware contracts.

It was recommended that OSD's independent Cost Analysis Improvement Group (CAIG) require that cost issues be addressed during development of the fiscal year 1987-91 defense plan.

Have these problems been resolved? When will they be? What is the Army doing about this?

General WAGNER. The Army's fiscal year 1983 budget request to the Congress to buy 48 aircraft on the second production contract was $965 million. The Congress, after taking several exceptions to details of the Army's estimate, appropriated $895 million for 48 aircraft. The Army accepted the challenge to manage the procurement of 48 aircraft with this reduced budget, however, it has been candid with the OSD and the Congress that if the Fixed Price Incentive contracts with Hughes Helicopters and Martin Marietta should go to the allowable ceilings, insufficient funding was appropriated by the Congress.

The second production contracts are now in progress with the first aircraft having delivered in January 1985. Cost and schedule reports do indicate a projected schedule delay and an over target price situation at completion, but the projected overruns do not exceed available funding. The Army is closely monitoring and intensively managing the contracts to preclude exceeding available funds.

Senator LEVIN. Does the Army agree with these 2 OSD branches?

General WAGNER. Yes. The data upon which the quotations were based was furnished by the Army to the OSD.

Senator LEVIN. General Wagner, is the Apache significantly underfunded and if so, won't that threaten the Army's ability to buy the total program of 675 aircraft?

General WAGNER. The Apache Program is not significantly underfunded. It is the Army's intent to procure 675 aircraft within the total budget request contained in the Selected Acquisition Report.

QUESTIONS SUBMITTED BY SENATOR EDWARD M. KENNEDY

REAL GROWTH RATES FOR TECH BASE AND RDT&E

Senator KENNEDY. What is the percentage real growth in tech base funding? How does that compare with the remaining portion of R&D?

General WAGNER. The Real Growth rate for the technology base is 12.3% while the rate for RDT&E as a whole is 16.8%.

DUGWAY PROVING GROUND

Senator KENNEDY. Please explain in detail the type of facilities and the nature of the activities planned in the improved facilities at Dugway Proving Ground.

General WAGNER. The improved facilities at Dugway Proving Ground (DPG) are needed as a result of the facilities being built over 36 years ago and both facilities and test capability allowed to deteriorate due to the de-emphasis of chemical defense. DPG is a Dept of Defense Major Range and Test Facility funded and operated by the Army. In recent years, there has been a change in a national policy, particularly for defensive equipment. Therefore, we must improve Dugway's technical and support facilities to be able to adequately test improved equipment currently being developed for potential chemical and biological warfare. DPG's mission also includes testing smoke munitions for obscuring our systems on the battlefield. The Munitions Processing Facility, one of the planned facilities, is where the receipt inspection unpacking, weighing, measuring, assembling and so forth is done. The facility will also provide a maintenance facility to take care of the weapons utilized. The new facility will consolidate operations currently done in 12 separate buildings plus improve security and safety.

The Ammunition Storage project will provide four earth covered igloos for conventional and smoke munitions. The current small magazines, built in the early 1940's, cannot be used because they are located under the flight path of Michael Army Airfield. This nonusage is due to higher utilization of aircraft and more stringent safety standards than when the present facility was built.

The Photo Optics Maintenance Facility will provide a maintenance and storage area for scientfic photography equipment. Due to limited storage room this equipment, some costing approximately a million dollars is often stored outdoors for extended periods. The new facility will allow for storage and also consolidate functions now performed in several different buildings of WWII vintage.

A control center for the testing at DPG is scheduled. The Operations Building will house video and computer control equipment needed to control tests, collect, and process data. Current test control facilities are located in numerous buildings which average 2½ miles away from the administrative center. The Operations Buildings will consolidate these efforts into one location. These facilities will allow for improved testing, better management, a more productive workforce and cost savings in future years.

COST RISK REVIEW

Senator KENNEDY. In your statement, you note that 10 systems have been subject to cost-risk reviews. Which systems were chosen? What was the basis for selection? In how many cases were costs projected to exceed programmed costs? By how much?

General WAGNER. These are the 10 systems that were chosen: Sgt. York Air Defense Gun System; Pershing II Missile System; Tactical Airborne Remotely Piloted Vehicle/Drone Systems; Position Locating Reporting System; Maneuver Control System; Advanced Antitank Weapon System—Medium; M1A1 Tank System; 155mm SP Howitzer Improvement Program; M833 Antitank Round; and Single Channel Ground & Airframe Radio System.

The basis for selection was review by the Cost Risk Executive Committee composed of flag-level military and civilians from Department of Army and the Army Materiel Command. Systems were selected based on uncertainties or risk factors exposed during the review process such as transition to production, accelerated schedule, concurrent testing, unresolved technical problems, etc. All systems reviewed had some cost risk associated with their programs. This is natural as the Army cannot afford to finance risk reduction to 100 percent confidence level so that there will be no unfunded risk remaining. The reviews did result in restructuring of programs and focused attention on previously weak areas resulting in timely positive action to correct deficiencies. In three systems additional funds were programmed to reduce risk. These funds were only a few percent over programmed costs for two of the three. The remaining system required approximately 10 percent additional funds over 3 years.

QUALITY ASSURANCE

Senator KENNEDY. Your report discussed a new program of contractor assessment reviews for quality assurance. What were the results of the reviews for programs in which reviews were completed last year? What changes were made as a result of these reviews? What systems will be reviewed this year? How were they selected?

General WAGNER. The programs assessed in 1984 were the Sgt. York (Ford Aerospace and Communications Co.); Bradley Fighting Vehicle System (FMC and Hughes Aircraft Company, Electro-Optical and Data Systems Group); Remotely Piloted Vehicle (Lockheed Missiles and Space Co.); Firefinder and Position Locating and Reporting System (Hughes Aircraft Co., Ground Systems Group); and Hellfire, Copperhead and Target Acquisition and Designation System/Pilot Night Vision System (Martin Marietta Orlando Aerospace). The Advanced Attack Helicopter (Hughes Helicopter, Inc.) was assessed in February 1985.

The findings varied according to the program and contractor being assessed. In general, problem areas were found which needed correction to improve quality and reduce costs. These areas typically included the need to stabilize design changes, improve manufacturing yields, improve vendor quality, reduce parts shortages in production, reduce scrap and rework, decrease use of waivers and deviations and improve responsiveness of contractor corrective actions. These changes are being made through formal corrective action plans that include both contractor and Army actions. Corrective action progress is monitored by the contracting activity and is reported to higher headquarters.

As a result of assesment experience gained to date, an Army Acquisition Integrated Database is being developed to track numerous indicators of program performance in production and development. The intent is to analyze the database in composite to isolate systemic problems which require policy changes. Initial analyses have resulted in proposals, now being evaluated, to improve the acquisition process. Assessments are done on an "on-demand" basis in response to problems as they occur. None are scheduled at this time. A system is selected when problem areas adversely impacting cost and schedule surface through normal reporting channels. An Army Materiel Command office is being staffed to execute a program of scheduled reviews, beginning in October 1985.

BALLISTIC MISSILE DEFENSE (BMD)

Senator KENNEDY. If a decision were made today to deploy a BMD system to defend ICBMs and critical command and control centers how long would it take to field a viable system? What existing technologies would be employed? How effective would such a defense be?

General WAGNER. The answer to such a question would depend on the type of system to be deployed. The Strategic Defense Initiative (SDI) will provide a basis to make such determinations. The SDI is conducting a vigorous program of research on emerging technologies in search of a better basis for a credible deterrence and to strengthen the stability of peace through strategic defense. Through examination of these technologies an assessment of the best approaches to defend against ballistic missiles may be made by the early 1990s. Only then would it be prudent to consider a decision for development and deployment of a defensive system. Any decision with respect to a particular system or approach at this point could be premature, based on incomplete information, and not in the best interest of our nation's security. It should also be noted that the SDI is not conceived as a means of bolstering offensive retaliation. Rather the program is designed to explore technologies with the potential of supporting a deterrent policy that reduces our dependence on offensive retaliation.

AH-64 APACHE HELICOPTER

Senator **Kennedy**. What are the principal vulnerabilities of the AH-64 Apache (in its current configuration and proposed operational employment) from ground attack?

General **Wagner**. Using a base case European threat scenario, the Soviet ZSU-23-4 anti-aircraft gun and the Mi-24 Hind helicopters are the principal ground and air threats to the AH-64 Apache helicopter. Significant vulnerability reduction has been designed into the Apache to counter these weapons. A few of these vulnerability reduction designs are:

	Against
a. [Deleted]	12.7mm
(Fragmentation)	23mm
	12.7mm
	12.7mm
b. [Deleted]	12.7mm
	12.7mm
	12.7mm
	23mm
	12.7mm

MULTIPLE LAUNCH ROCKET SYSTEM (MLRS)

Senator **Kennedy**. What submunitions are currently available for use with the MLRS?

Dr. **Sculley**. The submunition currently available for use with the MLRS is the Dual Purpose Improved Conventional Munition with the M77 submunition.

Senator **Kennedy**. What systems are under development?

Dr. **Sculley**. Systems under development are as follows:

a. AT 2 Scatterable Mine (German development only).
b. Terminal Guidance Warhead.
c. Binary Chemical Warhead.
d. SADARM (initial study only).

Senator **Kennedy**. Which of these submunitions will be effective against heavily armored enemy combatants?

Dr. **Sculley**. Systems effective against heavily armored enemy combatants are as follows:

a. AT 2 (German use only).
b. Terminal Guidance Warhead.
c. SADARM.

COPPERHEAD

Senator **Kennedy**. Your report states that Copperhead has achieved over 80% reliability. What is the reliability goal for Copperhead? When will it be achieved?

General **Wagner**. The present reliability requirement, 80%, is being met by the prime contractor. Bimonthly lot acceptance tests are conducted under the provisions of the existing Firm Fixed Price contracts. The FY 1982 contract provides the contractor the opportunity to receive an incentive, for exceeding the 80% requirement. In Lot Acceptance Tests since July 1982, there have been 173 hits out of 205 rounds fired for an average reliability of 84%.

JOINT TACTICAL MISSILE SYSTEM—ARMY

Senator **Kennedy**. Dr. Sculley, what is the current status of the Army's development program for JTACMS?

Dr. **Sculley**. The JTACMS-Army ballistic missile development effort will enter Full Scale Development in September of this year.

Senator **Kennedy**. Dr. Sculley, what delivery system will be used?

Dr. **Sculley**. The missile will be launched from the existing MLRS M270 launcher.

Senator **Kennedy**. Dr. Sculley, is the Army still studying modification of an existing missile?

Dr. **Sculley**. Although the likely contractors have indicated that they will draw heavily on experience from existing systems such as LANCE and previous Corps Support Weapon System work, the JTACMS-Army effort is essentially developing a new missile.

Senator **Kennedy**. Dr. Sculley, what are the range requirements?

Dr. **Sculley**. The requirement is for a minimum range of [deleted] and a maximum range of [deleted]. It may be necessary to trade off range for payload. In that event priority will go to payload.

Senator **Kennedy**. Dr. Sculley, what form of guidance system will be employed?

Dr. **Sculley**. Although the guidance system to be employed has not been specified by the Army, it is likely that an inertial navigation system will be used. The missile will achieve the required accuracy without update/assistance from external systems.

Senator **Kennedy**. Dr. Sculley, what types of warhead and/or submunitions will be used?

Dr. **Sculley**. The initial warhead developed for the missile will employ anti-personnel, anti-material (APAM) munitions. A variety of other submunitions are under consideration, such as SADARM, the MLRS Terminal Guidance Warhead, or an infrared guided submunition.

Senator **Kennedy**. Dr. Sculley, does the Army still have a requirement for a nuclear warhead for JTACMS?

Dr. **Sculley**. The Army is precluded by the 1985 appropriations bill from developing a nuclear warhead for JTACMS-Army. Lance will retain the current nuclear capability at Corps and will continue to support that mission as long as the systems can be economically retained in the field.

Senator **Kennedy**. Dr. Sculley, what opportunities does the Army see for commonality with the Air Force JTACMS?

Dr. **Sculley**. The two services are working closely on a number of initiatives to develop a complementary family of weapons for use in fighting the joint service AirLand Battle. One contribution will be an Army-developed ballistic missile system. The Air Force has announced that it will develop an air launched cruise missile system as another contribution to the JTACMS effort.

Senator **Kennedy**. Dr. Sculley, what range can be achieved through the use of MLRS? Is this consistent with past definitions of the requirement of JTACMS?

Dr. **Sculley**. The current MLRS rocket can achieve ranges of [deleted] with the fielded improved conventional munition warhead and [deleted] with the developmental terminally guided warheads. Government and industry analysis indicates that a MLRS-launched ballistic missile can deliver effective payloads out to the required ranges. This capability is consistent with previous definitions of the requirement for JTACMS.

JOINT TACTICAL FUSION PROGRAM

Senator **Kennedy**. What is the current status of the Joint Tactical Fusion Program? Have the services completed the restructuring of the program? Will this restructuring affect the contracts awarded last fall?

General **Wagner**. The restructuring was completed in December 1984. Jet Propulsion Laboratory (JPL), as system prime contractor, has completed its industry team of subcontractors, and detailed system design is in progress. The restructuring has no significant impact on the two major hardware subcontracts which were awarded last December, since all major elements of the restructured program has been included in the requests for proposal to which industry responded.

Senator **Kennedy**. Has the Army attempted to evaluate whether it could make use of existing fusion systems, such as the Air Force is now doing with LOCE? What is the basis for your conclusion?

General **Wagner**. I would like to emphasize that LOCE is a European Command asset and, as such, provides intelligence support to Army users as well as Air Force users in that theater. Although LOCE is significantly less capable than the Army All Source Analysis System (ASAS) and the Air Force Enemy Situation Correlation Element (ENSCE), the fusion systems now under development within the Joint Tactical Fusion Program, it is performing a valuable service in support of our forces in Europe, while providing useful feedback to the development process for ASAS/ENSCE.

Except for LOCE, the Army has no true fusion systems. It does, however, have two systems in the field which provide limited automation support for selected intelligence functions. The Technical Control and Analysis Center (TCAC) supports the processing of signals intelligence (SIGINT) information and the control and tasking of SIGINT and electronic warfare assets. MICROFIX is an off-the-shelf microcomputer system used for tactical intelligence and electronic warfare applications. Neither of these systems is able to correlate multisource data and from that to generate enemy situation assessments, as fusion systems such as ASAS and ENSCE must do.

MICROFIX nonetheless plays an important role in our evolution toward a true fusion system. The first module of the ASAS to be fielded (The ASAS Interface Module) will be used to integrate existing MICROFIX computers into a network and to afford a greatly expanded data base capability compared to MICROFIX. The combination of MICROFIX terminals and the AIM, while far below ASAS in capability, will represent a vast improvement over MICROFIX alone. This initial, limited capability system will be available in production quantities in [deleted]. This is based on initiating AIM production in fiscal year 1987.

At present we have no plans to incorporate the TCAC into the ASAS architecture. The ASAS design includes the functionality now resident in TCAC, thus making TCAC redundant once ASAS is available. We believe we can provide more comprehensive intelligence support to the Army as a whole by redeploying TCAC from units receiving ASAS to units which have neither a TCAC nor an ASAS capability.

Senator KENNEDY. When will we begin to field the Joint Tactical Fusion system? Has the Army reevaluated the system to assure that we can field at least a limited capability at the earliest possible date?

General WAGNER. Production of the first two system modules will begin in fiscal year 1987. These modules, in conjunction with MICROFIX, represent a limited capability system that will be in the field starting in [deleted]. The first limited capability RDTE system will be fielded to the 9th Infantry Division in [deleted] and, in fact, a brassboard version of the ASAS Interface Module (AIM) is already in existence. This brassboard AIM is being used this month (March 1985) by the 9th Infantry Division in Exercise Border Star.

The full, objective ASAS/ENSCE system will be in production in fiscal year 1988, leading to initial fielding in [deleted].

Senator KENNEDY. Is the Air Force still committed to a joint program?

General WAGNER. Yes. The Air Force remains firmly committed to the joint program.

MULTIYEAR PROCUREMENT

Senator KENNEDY. The Army is proposing multiyear procurement of several systems. What are the projected savings (in dollars and as a percentage of the total cost) from multiyear procurement for each of these systems?

General WAGNER. The proposed fiscal year 1986 multiyear procurements, projected dollar savings, and projected percentage savings are as follows:

[In millions of dollars]

System	Savings	Percent savings
Abrams Tank System (840 per annum):		
M1A1 Tank Chassis [1]	390.5	9.5
AGT 1500 Turbine Engine	160.8	12.5
LRF & TIS Fire Control Components	96.8	14.5
Computer Electronic Unit & Control Panel Components	8.6	14.5
T700 Series Engine	71.1	10.0
M9 ACE	31.2	7.0
Bradley Fighting Vehicle Transmission	25.5	8.9

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[1] Pending approval in the Office of the Secretary of Defense.

NIGHT VISION

Senator **KENNEDY**. a. What is the status of the Army's proposal for multi-year procurement of night vision systems? b. What is the savings from multi-year procurement? c. What savings accrue from a one time competition as opposed to annual competition for these systems? d. What protections have been included to assure continued participation by small business contractors and subcontractors?

General **WAGNER**. a. The five year multi-year procurement plan is complete and the Request for Proposal for Night Vision Devices will be issued on Mar. 13, 1985.

b/c. The cost savings realized from the multi-year procurement is approximately $145M. This results from the ability to reduce programmed funding, yet increase the procurement quantities of night vision devices.

d. Prime contractors will be required to subcontract 25% of total contract value to Small Business concerns and 1% of total contract value to the Small Disadvantaged Business concerns. Additionally, the prime contractor will be required to submit a Small Business Subcontracting Plan to the government.

ANTI-TACTICAL MISSILE SYSTEM (ATM)

Senator **KENNEDY**. Has the Army reached a final decision on how to allocate the funds appropriated for the Anti-Tactical Missile for fiscal year 1985?

General **WAGNER**. The Army has made a decision on the allocation of appropriated ATM funds for fiscal year 1985. In accordance with congressional guidance, fiscal year 1985 funds will be used primarily for modifications to the Patriot Air Defense System to provide defense against short range missiles such as the SS-21 and SS-23. Of the $32.3M ATM fiscal year 1985 budget, $18.0M is planned for Patriot ATM upgrades, while $3.0M is planned for Hawk ATM upgrades. The remainder of the fiscal year 1985 ATM budget is planned for ATM battle management, sensors, threat, target vulnerability, and Project Office/Special Study Group support.

Senator **KENNEDY**. To what extent is the funding being used for upgrades to the Hawk system?

General **WAGNER**. Fiscal year 1985 funds will be used to initiate a Hawk upgrade program to provide a capability against cruise missiles.

Senator **KENNEDY**. To what extent is the funding being used to counter cruise missiles—as opposed to ballistic missiles?

General **WAGNER**. The fiscal year 1985 program was structured to provide $18.0M for Patriot Air Defense System upgrade to primarily counter ballistic missile defense and $3.0M for Hawk improvement in cruise missile defense.

PATROIT MISSILE SYSTEM

Senator **KENNEDY**. What capabilities can be included in an upgraded Patriot?

General **WAGNER**. The Patriot ATM Upgrade Program will provide a capability to counter the conventionally armed current and projected SS-21 and SS-23 Tactical Ballistic Missile (TMs).

Senator **KENNEDY**. How does this correspond to the current and projected threat?

General **WAGNER**. The current and projected TM threat to the Surface-to-Air Missile (SAM) sites are the [deleted]. These missiles, which are available in large numbers, can be used to supress SAM sites [deleted] to their target areas and the potential to change the course of the whole AirLand Battle. The Patriot TM self defense program capability is designed to counter the SS-21/SS-23s so Patriot can survive the conventional TM attack and engage the Air Breathing Threat. A capability against the [deleted] by the Warsaw Pact and not a conventional threat to SAM sites. However, preliminary studies indicate that Patriot, with major modifications, can be upgraded to provide significant capability against the SS-22 TM and the advanced cruise missile threat.

Senator **KENNEDY**. Can the Patriot System be used as a defense against strategic missiles? If not, why not?

General **WAGNER**. The current Patriot ATM System upgrade will [deleted]. Major modification to, or replacement of, system components would be required (particularly the radar and missile) which may constitute a new weapon system. [deleted] which must be addressed by strategic ABM systems rather than tactical air defense systems such as Patriot. Patriot upgrades to counter tactical ballistic missiles do not violate the Anti-Ballistic Missile (ABM) Treaty, however, any upgrades to system or any new systems to counter strategic ballistic missiles would be prohibited by the Treaty.

AQUILA RPV

Senator **Kennedy**. What is the status of the Aquila RPV program?

General **Wagner**. Aquila is currently in the 67th month of a recently restructured 79-month Full Scale Development (FSD) program and has begun contractor prototype qualification tests (PQT) at Fort Huachuca, Arizona. Twelve of twelve PQT flights have been successfully completed in a sequence scheduled to end in April 1985. PQT objectives, addressing performance of the entire system, both airborne and ground components, are being met. Concurrently, ten flights have been successfully flown at Fort Sill, Oklahoma as a part of Operational Test II training and ten flights have been successfully flown at Fort Hood, Texas using an Early Operational Capability (EOC) (prototype) system. The EOC system is being operated by soldiers in the 1st Cavalry Division. The test program is ahead of schedule.

Senator **Kennedy**. Are requirements which have determined the design of Aquila still valid?

General **Wagner**. The requirements for the Aquila system have been continually reviewed and revalidated since program initiation. In September 1984, the Army conducted one of the most exhaustive reviews of the system requirements that has ever been performed on any system. This review clearly demonstrated that Aquila requirements are based upon the approved organizational and operational concept and on a threat establishing the minimum need. Aquila will provide a revolutionary capability on the modern battlefield giving the Army an opportunity to effectively and economically employ conventional field artillery weapons and Copperhead.

Senator **Kennedy**. I understand the Army conducted a thorough review of the program in September. What was the reason for that review? Has the program been restructured?

General **Wagner**. The contractor announced his inability to meet the original program schedule. This led the Army to conduct several in depth reviews of operational requirements and overall program strategy. In September 1984 the Army reviewed the program and determined that based upon the limited test data available, a final program decision could not be made. The program was again examined in December 1984 near conclusion of Contractor Engineer Development tests. At that time sufficient data was available that indicated significant improvement in contractor and system performance. Hence the Army developed a restructured program which supported development of the target acquisition/designation, aerial reconnaissance system and extended the program from 70 to 79 months. The new schedule minimizes risk by eliminating concurrent execution of DT II and OT II and provides more time for the contractor to prepare for the test cycle.

Senator **Kennedy**. Does the Army have a requirement for an RPV such as the Skyeye? What missions would it perform? Would procurement of such a system modify the requirement for Aquila?

General **Wagner**. The Army is considering use of alternate RPVs to satisfy operational requirements in which the full capabilities of Aquila are not needed. A mix of systems is being studied to address the full scope of possible RPV missions such as longer range/higher altitude intelligence warfare requirements and operations in a low intensity combat environment. The requirement for Aquila remains unchanged.

PATRIOT MISSILE SYSTEM

Senator **Kennedy**. Since the committee met last year, the Army completed the Follow-On Evaluation III for Patriot. What were the results of that test?

General **Wagner**. Follow-On Evaluation III (FOE III) was conducted July 16, 1984 through Sept. 23, 1984 at Fort Bliss, Texas by the Army's Operational Test and Evaluation Agency. FOE III consisted of a pilot test, following by an integrated maneuver and search/track phase that was followed by a live fire phase. Operation evaluation of the three battery Patriot Battalion was conducted in a simulated combat environment and included 24 hours per day operations, the use of electronic warfare operations and realistic scenarios. Extensive field maneuvers, large scale air attack scenarios involving multiple and maneuvering targets, and an intense electronic countermeasures tactics by attacking forces, exercised the capabilities of the personnel and equipment to perform combat mission. Four live missile firings culminated the successful evaluation. All four high-perfomance jet targets, flown in a severe electronic countermeasure environment, were destroyed. Throughout the test, Patriot system availability was high and supportability excellent. In short, test criteria were met or exceeded.

PATRIOT DEPLOYMENT

Senator Kennedy. General Wagner, what is the status of Patriot deployment? Does the Army have a requirement for forward deployment of the Patriots to supplement or supplant the Hawk belt?

General Wagner. Senator Kennedy, the first European Patriot battalion was formally accepted by United States Army, Europe on 5 March following full operational demonstration on the battalion's tactical sites. The second European battalion is now undergoing training at Fort Bliss, Texas and is scheduled to deploy this summer. The United States has a NATO requirement for air defense of the central sector of NATO's Central Region. The Army is modernizing its portion of that air defense by supplanting its forward Hawk belt with Patriot. Additional Patriot units will be integrated into the base defenses of USAF main operating bases which are located to the rear of the forward missile belt.

PATRIOT MISSILE SYSTEM

Senator Kennedy. What progress has been made in restoring the production schedule for Patriot?

General Wagner. Fire unit production is projected to recover to contract in September 1985. Nine Fire Units are planned for March through September 1985, beginning with two sets this month. Current production status fully support this recovery. Missiles are also projected back on contract schedule by the end of the year.

Senator Kennedy. What is the justification for increasing the number of missiles procured, while maintaining the current rate of production for fire units?

General Wagner. The present level of missile procurement is not sufficient to support the Patriot fielding schedule. Ramp up of missile procurement is necessary to support the basic load and reload requirements for the Fire Units deployed in tactical units. These stocks of missiles are considered the minimum requirement for mission performance.

IFF CAPABILITIES OF PATRIOT

Senator Kennedy. What are the current IFF capabilities of Patriot?

General Wagner. Patriot uses the Mark XII IFF, the system used in other U.S. air defense systems. In addition, Patriot has a passive identification feature that automatically evaluates an aircraft's compliance with activated airspace control measures using flight path history information processed on Patriot's weapon control computer. Passive identification incorporates IFF response information from the Mark XII. The ID process, at the operator's option, can be totally automatic with a manual override capability; or it can be used solely to provide data for manual evaluation and decision. In either of these two modes, the results are automatically distributed to the entire air defense community.

Senator Kennedy. How effective is this approach? What is the current danger of firing on friendly forces?

General Wagner. The Patriot ID procedure has been tested, most recently in Follow-on Evaluation III, and has demonstrated that it is timely, accurate and highly effective. No other currently fielded U.S. air defense system has the advantage of a passive identification capability.

Senator Kennedy. What plans are being made to upgrade those capabilities?

General Wagner. There are no definite plans to upgrade Patriot's IFF capability as it has proven to be highly effective in its present configuration.

MOBILE SUBSCRIBER EQUIPMENT [MSE]

Senator Kennedy. a. What is the current status of testing for the competing candidates for MSE?

b. How do these tests demonstrate the appropriateness of these systems for U.S. use?

c. What tests are being done to assure the interoperability of the candidate systems with other U.S. equipment?

Dr. Sculley. a. The MSE nondevelopment item (NDI) acquisition envisions competition between existing systems that are in production and have already been subjected to extensive testing. As part of the competition, the offerors are also required to demonstrate their systems to an Army evaluation board. This demonstration must show that the system performs according to the offeror's specifications and complies with the five functional requirements listed in the request for proposal. These demonstrations will be completed in mid-April.

b. The tactical environment in which the existing systems were tested closely resembles the U.S. Army tactical environment and thus the results obtained are appropriate for U.S. Army use.

c. The demonstrations conducted during the competition include the requirement to show the interoperability inherent in the offered systems with existing Army systems such as the TRI-TAC network and tactical satellite terminals. U.S. equipment has been provided to the offerors to allow this capability to be demonstrated. Required interoperability not inherent in the offered system must be included in the proposal as a priced option. Features included in options exercised by the Government will have to be demonstrated during production acceptance testing.

Senator KENNEDY. Dr. Sculley, you are requesting $335.3 million for the Mobile Subscriber Equipment program which will place current technology "cellular" telephones in service in the Army.

a. When will the Army announce the results of source selection?

b. Does the Army intend to proceed with MSE if the system is not interoperable without spending further Research and Development funds to modify the winning proposal?

c. How does the Army intend to satisfy the congressional requirement to conduct a "user evaluation" of MSE before proceeding with the program?

d. What analysis has the Army conducted of the vulnerability of MSE to enemy electronic warfare? Did or will either contrator team demonstrate their proposals under threat conditions during the one-week demonstration periods?

e. Last year Congress provided half of the funds you requested for MSE. What was the impact of the reduction on the program? If a comparable percentage reduction were imposed this year, what would be the impact?

Dr. SCULLEY. a. Source selection results are scheduled to be announced in July 1985.

b. Any required interoperability not inherent in the basic system will be provided by the exercise of priced options on the production contract. Research and development funds will not be required.

c. User evaluation is an on-going part of the source selection effort. The operational suitability panel of the evaluation board is composed entirely of users. These users have been conducting a rigorous detailed evaluation of the proposals since they were submitted in October 1984. Part of the evaluation is based on witnessing the system demonstrations conducted in December 1984 and March 1985. A User Follow-On Test and Evaluation will be conducted at Ft. Hood beginning with the 2nd Armored Division, the first fielded unit and continuing with the fielding of the 1st Cavalry Division and the 16th Corps Area Signal Battalion until a representative Corps system is tested.

d. The primary strength of MSE in an electronic warfare environment is the large number of identical nodes (approximately 50 in a Corps with five divisions). The system automatically routes traffic around nodes which are either jammed or otherwise inoperable. The number and dispersion of the nodes makes it difficult to jam a major part of the network at any one time. Mobile terminals have the capability to reaffiliate with another node and re-enter the network in the event of jamming.

The validated threat to MSE was provided to the offerors as part of the request for proposal. The offerors were required to evaluate the threat and provide an analysis of the performance of their system against the threat. That analysis is being evaluated as part of the source selection process. Neither offeror demonstrated their system under threat conditions.

e. The original plan was to procure enough equipment with fiscal year 1985 funds to equip one divison and begin establishment of the training base. The fiscal year 1985 reduction made it impossible to procure enough equipment to field a division. Fiscal year 1985 and fiscal year 1986 funds are required to equip the training base, 2 divisions and 1 Corps area singal battalion in III Corps at Ft. Hood, Texas. A comparable fiscal year 1986 reduction would not provide enough equipment to conduct the representative Corps level system test and would significantly prolong the length of time III Corps will suffer the reduced operational readiness caused by having a mix of different generation communications equipment. Additionally, intorduction of MSE into the Army saves a significant number of personnel and reduces the dollar requirement to modernize our tactical communications. Deferring or slowing the introduction of MSE will delay the personnel savings, cancel the dollar savings and leave the Army with outdated tactical communications equipment.

TANKS

Senator **Kennedy**. In your statement, you state that Soviet tank developments have in some cases surpassed the technology advantage enjoyed by the United States and our allies. In what respects are the new generation tanks superior to the M1? Inferior to the M1?

General **Wagner**. Firepower, survivability, and mobility are important attributes in tank comparisons. Included in mobility are considerations of engine size and power, weight, acceleration, [deleted].

Performance characteristics are summarized in the following table:

Characteristics	M1	T80	Advantage
Firepower:		[Deleted.]	
Main Gun	105mm		
Ammunition	M833 APFSDS (DU)		
Basic Load	55 rds		
Loading Process	Manual		
Fire Control	Full stabilization, laser ranging, lead compensation digital computer, can adjust for non-standard conditions.		
Gunner sighting devices:			
Day	Direct view optics		
Night	Thermal		
Survivability:			
Armor Protection	Special M1		
Detectability:			
Height	2.4m		
NBC protection	Ventilated face-piece (VFP), basic armor shell for radiation protection.		
Mobility:			
Engine	Turbine, 1500 HP		
Transmission	Automatic, 4 forward and 2 reverse gears		
Weight	54 metric tons		
Cross country speed	30–35 mph		
Time to accelerate from 0–20 MPH (sec)	7.0		
Road speed	40–45 mph		

+ Significant advantage   Slight advantage   ? Intelligence estimate

STINGER

Senator **Kennedy**. I understand that the Stinger request contains a proposal to spend $15 million on "ground support equipment" which is intended to finance purchase of approximately 50 so-called Pedestal Mounted Stinger fire units for fielding with the 9th Motorized Division at Fort Lewis.

Is there a required operational capability document underlying this procurement request?

General **Wagner**. Yes. The requirement document is a Quick Reaction Program (QRP) which identifies an urgent need of the 9th Motorized Division to provide Stinger missiles with a "shoot-on-the-move" and day/night, and limited weather capability by mounting them on a High Mobility Multipurpose Wheeled Vehicle (HMMWV).

Senator **Kennedy**. What was the basis for deciding that this combat system is considered "gound support equipment" instead of a combat vehicle with a requirement justification developed in a manner similar to other combat systems?

General **Wagner**. Pedestal Mounted Stinger (PMS) is an enhancement to the Stinger manportable Air Defense System and was placed in the Stinger Ground Support Equipment line during the formulation of the fiscal year 1986 Budget. In the formulation of the fiscal year 1987 Budget, a new line for (PMS) will be created and funds transferred to this line. The requested PMS funds are for a new non-developmental item of equipment to be procured for the 9th Motorized Division.

Senator **Kennedy**. Does the Army intend to buy Pedestal Mounted Stingers for all light divisions in the Army?

General **Wagner**. The Army believes that the Pedestal Mounted Stinger concept has application for all of our divisions to improve the manportable Stinger capability. The Army's primary objective is to first fulfill the urgent need of the 9th Motorized Division and then to begin replacing the manportable Stingers with Pedestal Mounted Stingers for the rest of the force, with priority going to the Army National Guard. the Army's decision to continue procurement will be based on a follow-on evaluation of the system conducted at the 9th Motorized Division.

Senator **Kennedy**. If the Pedestal Mounted Stinger program is requested this year in order to test a concept, why are 50 required and why was it not requested in the research and development appropriation?

General **Wagner**. These units are not being procured to test a concept but are being procured to fulfill an urgent need of the 9th Motorized Division and are being acquired as a non-developmental item.

UNIT LEVEL CIRCUIT SWITCH

Senator **Kennedy**. The Marine Corps is currently conducting limited operational testing on the Unit Level Circuit Switch. This switch is part of the TRI-TAC communication system and has been developed for all the services.

a. Does the Army intend to buy the Unit Level Circuit Switch if it passes operational tests this summer? Are there sufficient funds in the Army's 5-year plan to buy these switches? What quantities and costs are budgeted by the Army over the next 3 years?

b. Do the Army's plans for Mobile Subscriber Equipment affect plans to purchase the Unit Level Circuit Switch? Will the Army buy ULCS if it proceeds with the MSE program? Will the Army's purchase plans for ULCS vary based on the winner of the MSE competition?

Dr. **Sculley**. a. The decision on the Unit Level Circuit Switch program will be made at a production review scheduled for June 1985. All aspects of the program to include the results of operational testing and price will be considered at this review. Adequate funds are available in the five-year plan to commence procurement of Unit Level Circuit Switches. The current Army budget for fiscal year 1986–88 is shown below.

	Fiscal year—					
	1986		1987		1988	
	Million	Quantity	Million	Quantity	Million	Quantity
AN/TTC-42A	$20.7	23	$8.3	9	$47.3	54
SB-3865	10.7	56	12.1	62	35.6	205

Adjustments may be necessary after actual prices are determined following completion of negotiations with contractor.

b. The Unit Level Circuit Switch and Mobile Subscriber Equipment programs provide communications for different parts of the Army. Mobile Subscriber Equipment will be fielded in divisions and Corps. Unit Level Circuit Level Switches will be fielded as part of the TRI-TAC network in echelons above Corps. Both systems are needed. Results of the Mobile Subscriber Equipment competition are not expected to impact plans for the Unit Level Circuit Switch program.

BRADLEY FIGHTING VEHICLE

Senator **Kennedy**. Last year there were several reports criticizing the Army for its testing program on the Bradley Fighting Vehicle. Would you please summarize that controversy, and outline the current test program?

What is the Army doing to reduce the vulnerability of the Bradley?

General **Wagner**. In 1982 the Army began a study to validate the use of aluminum armor (vice steel) in combat vehicles. The study included considerations of tactical and strategic mobility implications resulting from weight differences, structural/material qualities, and the expected munitions to be encountered. Because the aluminum armors provide better protection at less weight against ballistic munitions (bullets, fragmenting artillery, etc.), aluminum has normally been selected for light armored vehicles such as the Bradley. This study included one additional consideration—the armor's performance against the effects of shaped charge warheads. Media claims of a catastrophic "vaporific" phenomena due to the use of aluminum in armors seemed to validate an earlier United Kingdom test and press reports from the events in the Falkland Islands. These conclusions countered what Army engineers already knew: that although a vaporific effect does occur and is greater for aluminum than for steel armors, it certainly is not catastrophic. In fact, Army engineers believed the effects to be insignificant as a casualty producer.

The solution of these divergent views was a carefully constructed series of tests with the objective of defining quantitatively and qualitatively the mechanisms which produce the "vaporific" effects in lightly armored fighting vehicles. It should be stressed that these tests were not a vulnerability assessment or an evaluation of any specific piece of equipment—they were an attempt to define a phenomenon in a manner useful to armor designers.

Initial test results provide scientific evidence that the media accounts previously mentioned are greatly overstated. The consequences for crews of armored vehicles of any vaporific effects are not severe. Given the impact of a shaped charge munition large enough to cause an appreciable vaporific effect, it is the primary effects of the weapon, not the vaporific effects, which completely dominate as the casualty producers. The primary effects are blast, internal fragmentation of the armor wall (spalling), and possible resultant fires of stored ammunition and fuel.

On 27 March 1984 the Office of the Under Secretary of Defense (Research and Engineering) (DDTE) published a Joint Live Fire Test Group charter (JLFTG) which had as its objective the quantification of the lethality of major caliber antiarmor munitions against first line armored vehicles. Plans were made to piggyback the JLFTG testing with the ongoing Army effort, but fundamental differences developed between the Army and the Joint Live Fire Test Group (OSD) as to the approaches to be taken in the JLFTG program. Although both parties recognized the importance to soldiers of vulnerability testing, the timing and the methodology of the tests based on the Army objectives dealing with vaporifics and the joint test group's interest in vulnerability/survivability created a situation where both parties could not be accommodated due to time and resources available. The JLFTG wanted to conduct immediate full-up shots at Bradleys. They did not agree with the systematic approach favored by the Army and their approach could have caused the loss of the target vehicle without gaining the required information.

The issue of armored combat vehicle vulnerability to shaped charge warheads should be prefaced with the following:

a. Even small shaped charge warheads can penetrate over one foot of high hardness steel. The technology required to allow light combat vehicles to defeat shaped charge weapons was not known when the Bradley was developed. In fact, even the development of a heavier vehicle would not have solved the problem of defeat by all shaped charge weapons. Accordingly, the Bradley was designed to defeat 92 percent of the weapons expected to be encountered on the battlefield, and has successfully demonstrated that it is capable of doing so.

b. Now that we have developed the technology to defeat some shaped charge weapons we are studying its application to the Bradley as part of our survivability studies.

Real benefit can only be gained by understanding the mechanisms which produce casualties, then applying knowledge gained to minimize them.

A vulnerability/survivability assessment will be conducted in two phases starting in March 1985. The first phase will consist of at least ten shots at fully combat loaded Bradley Fighting Vehicles. These shots will include a variety of threat antitank weapons with the main objective being identification of vulnerability problems. The second phase will address survivability improvement modifications to the target Bradleys based on vulnerability analysis from the first phase. The second phase to be completed by the end of fiscal year 1986 will allow proven survivability improvements to be included in the Bradley block 2 modification program. This program is designed to upgrade the Bradley fleet to meet the threat of the 1990's.

The Army's plans to increase the survivability of the Bradley are being accomplished by increasing the level of armor protection and by using interior stowage and protective techniques which will decrease the probability of catatrophic damage if a penetration occurs. Current plans are to incorporate these changes into the fiscal year 1989 procurement program. High payoff individual changes, which are identified as beneficial from the Ballistic Research Laboratory Bradley survivability shooting, will be cut into production at the earliest possible date.

QUESTIONS SUBMITTED BY SENATOR ALAN J. DIXON

DIVAD

Senator DIXON. It is my understanding that the follow on operational test for Divad scheduled for this spring is unlikely to be completed before our committee is to report its recommendations for fiscal year 1986. I don't believe we can provide a blanket authorization for Divad in the absence of the results of those tests. What would be the impact if no Divad fire units are authorized for fiscal year 1986, but language permitting supplemental authorization is provided in our bill?

Dr. SCULLEY. There are a number of program impacts; the severity of which depends on when fiscal year 1986 funding becomes available. First, the fiscal year 1984 Option III will have to be extended to preclude a system level production break. Second, a subcontractor production break will occur. Third, fiscal year 1989 procurement will be required. Fourth, advance procurement funding, starting in fiscal year 1986, will be required for all subsequent years. Finally, program cost will increase.

Senator DIXON. What has to be done to insure that continuity at the subcontractor level is assured, even if we choose not to authorize fire units in fiscal year 1986?

Dr. SCULLEY. In order to preclude a production break in fiscal year 1986, two things are required. First, fiscal year 1985/86 advance procurement of $325-350 million (to be awarded by 1 QTR, fiscal year 1986) and approximately $40 million for Government in-house support are required. Second, the fiscal year 1987 program must be awarded NLT 1 QTR fiscal year 1987. The extensive advanced procurement requirement stated above results from the compressed leadtime between award of the fiscal year 1987 program and first delivery (approximately 8 months later). Without this funding, the resulting break in production, particularly at the subcontractors level, would be extensive and would result in significant cost penalties to the program.

Senator DIXON. If the Divad program is terminated after Option III, presuming the Secretary of Defense authorizes continuation of the program, how will the Army employ Divad fire units? If the program is terminated with Option II, where will the Army place the 144 fire units authorized and produced in the first two options?

Dr. SCULLEY. If the program is terminated at the end of Option III (263 fire units), it is probable that Sergeant York would still be employed in each of the heavy divisions, but in a reduced quantity and perhaps jointly with a complementing air defense system. If the program is terminated with Option II, two courses of action are being considered: (1) form corps Divad battalions in each of the three heavy corps using the 146 fire units; (2) terminate production immediately and do not field the system at all—given the inability to adequately cover the forward deployed heavy divisions, the lack of a rotation base and supportability constraints. In all cases of terminating at Options II or III, further studies and analyses will have to be conducted to determine the tactical merit, supportability, quantities and mix of complementing weapons prior to any final decision.

Senator DIXON. If the Divad program is terminated with Option II, will the Army still plan to install Stinger Missiles on Divad fire units? Is it worth integrating Stinger Missile fire controls into the Divad fire control system if there are only 144 Divad fire units?

Dr. SCULLEY. If decreased quantities of Divad are fielded, further studies and analysis will have to be conducted to determine the tactical merit and cost effectiveness of installing Stinger on the Sergeant York. If Stinger Missiles were to be installed on the Sergeant York, fully integrating the fire controls would enable Sergeant York crews to maximize the capabilities of the Stinger in combination with the sophisticated acquisition and tracking capabilities of the Sergeant York.

Senator DIXON. My staff informs me that there has been another slip in production at Ford. Is that the case? If that is the case, why is the contractor continuing to have problems?

Dr. SCULLEY. Ford Aerospace is delivering to the revised production schedule negotiated with the Army in November 1984. In February 1985, four of the five scheduled fire units were delivered by February 28, 1985. The fifth system was delivered the next day, March 1, 1985.

QUESTIONS SUBMITTED BY SENATOR JOHN GLENN

LIGHT HELICOPTER FAMILY (LHX)

Senator GLENN. Dr. Sculley, last year in testimony before this committee you stated the following goals for the LHX: 6,000-8,000 lb. gross weight; flyaway costs

(FY 84$); Utility $3-4 million; Attack $5-6 million; single pilot operations; and 30-40% reduction in annual operating costs.

Are these still your planning goals for LHX? Has your research during the last year led you to conclude that any of them are unattainable?

Dr. SCULLEY. These are still the planning goals for the LHX with one exception. The gross weight goal has been revised to be 8,000 lbs plus or minus 500 lbs for the SCAT primary mission gross weight. The Government and industry concept exploration design and analytical efforts to date indicate that these LHX planning goals are ambitious but achievable.

Senator GLENN. You have a need to buy 4,000-5,000 of these helicopters. You are counting on the price coming in at $5 million each. Even then it is a $40 billion program. Do you think it will be a challenge to meet that cost goal? How much cost-growth over your target can you tolerate before LHX becomes unaffordable? Have you conducted a cost and effectiveness analysis that compares LHX with modified commercial or military aircraft for this mission? How much more expensive in percentage terms are the alternatives compared to LHX? Does that constitute your "upper bound" on cost growth before you will entertain alternatives to LHX?

Dr. SCULLEY. The goals for LHX are $6 million or less flyaway cost (fiscal year 1984 dollars) for the LHX SCAT and the $4 million or less for the Utility version. These cost goals are challenging, but achievable, based upon government and contractor preliminary design efforts to date. Cost growth exceeding the $4 million and $6 million figures would make the LHX unaffordable.

The Cost and Operational Effectiveness Analysis is underway and final results are expected in early 1986. The COEA will look at specific alternatives for modernizing the current fleet including LHX additional purchases of the AH-64, UH-60 and AHIP as well as modification of "off the shelf" commercial aircraft. Preliminary analyses indicate that the modified AH-64 and UH-60 alternative would result in approximately 40 percent higher production costs and 50 percent higher operating and support costs for comparable quantities of aircraft when compared to the LHX. The Army has not identified a commercial aircraft or commercial derivative which would satisfy the LHX requirements.

The LHX cost goals are considered to be the upper bound for the program at this stage of development.

Senator GLENN. To date you have received approximately $75 million and are requesting $146.3 million this year. What has been accomplished during the past year to justify spending $146 million this year on LHX? Is there a Required Operational Capability document to guide your research and development activities? Have you determined the feasibility of the program goals outlined last year for LHX?

Dr. SCULLEY. In fiscal year 1985 the Army received $48.3 million for the Advanced Rotorcraft Technology Integration (ARTI) program and $24.4 million for Full Scale Development of the T-800, 1200 shaft horsepower engine for LHX. This past year the Request for Proposal for the engine was released. The source selection evaluation panel is now reviewing proposals submitted in response to the Request for Proposal in anticipation of a June 1985 competitive award of two T-800 Full Scale Development contracts.

Five contractors—Boeing, Bell, Sikorsky, Hughes and IBM have been selected as ARTI contractors. All five have completed LHX mission and task analyses and have initiated preliminary design of their integrated/automatic single pilot cockpit. Full authority automatic flight maneuvers have been demonstrated by Bell Helicopter. Hughes Helicopters has initiated wind tunnel testing and full mission simulation of their LHX concept. Boeing Vertol's ARTI flight test bed has initiated flight testing. A joint Air Force/Army wide-field-of-view helmet-mounted display demonstrator program has been initiated; preliminary design of several concepts completed; and part task simulation is on-going to evaluate competing concepts. The joint Army/OSD Very High Speed Integrated Circuits (VHSIC) airborne computer effort has been initiated with all five ARTI contractors to reduce development risk. Proposals are due from industry in March 1985 to initiate LHX wind tunnel and engineering simulation risk reduction. All four major helicopter manufacturers have completed their own trade-off analysis, developed their best technical approach to the LHX and are completing their life cycle cost and Reliability, Availability, and Maintainability/Integrated Logistics Support (RAM/ILS) analysis to prove the LHX concept and the feasibility of program goals. A Letter of Agreement (LOA) which establishes the nature and characteristics of LHX, and begins to define requirements has been prepared. The final Required Operational Capability (ROC) document will be completed after the Cost and Operational Effectiveness Analysis (COEA) in 1986. The Government best technical approach and COEA efforts have been initiated. The program goals outlined last year for LHX are ambitious but achievable with one minor modification.

The gross weight goal for LHX has been refined to be 8,000 ±500 pounds.

Senator **Glenn**. Last year Senator Goldwater asked what would be the impact of a deferral of funding on LHX, and General Merryman stated it would delay overall modernization. The Congress approved your request in full, yet this year your budget documentation indicates that you have slipped the date of full scale engineering development and initial operational capability. Despite the slip in your program you are requesting more money for the Advanced Rotocraft Technology Integration/LHX program than you stated last year was your requirement. Is the LHX program still on course? Why do you need more money for a program that has been stretched out? Does this indicate that the cost goals established for LHX might be too optimistic?

Dr. **Sculley**. The LHX Full Scale Development moved from June 1986 to January 1987 primarily because of limited funding in fiscal year 1984. As the result of a denied reprograming request, the Army had only $1 million in fiscal year 1984 to initiate five Advanced Rotorcraft Technology Integration (ARTI) contracts.

The work in ARTI in fiscal year 1986 will complete the critical technology demonstration of single pilot feasibility and support preliminary designs of the most important elements in the mission equipment package. Additionally, the ARTI funding will support essential wind tunnel and simulation work.

LHX is on course and can remain so if adequate resources are provided to complete the technology programs in fiscal year 1986 and continue the T800 engine development.

In fiscal year 1986, the Army's combined request for ARTI and T800 engine development is less than shown in the combined fiscal year 1986 columns of the fiscal year 1985 budget. Industry and Government preliminary design estimates continue to show that LHX cost goals are challenging, but achievable.

Senator **Glenn**. How much of the cost of total development of LHX is related to trying to develop a single-pilot capability? Has the Army decided officially it will operate LHX exclusively with a single pilot? Why not abandon the single-pilot goal now and save the development costs, especially since the Army hasn't decided it will ever operate LHX exclusively on a single pilot basis?

Dr. **Sculley**. The development cost for single pilot operation is no different from development cost for a two crew operation. The automation and integration requirements to operate the LHX through all its mission profiles under day/night and adverse weather conditions define the mission package and subsequent development requirements.

The Army goal for LHX remains single pilot operation. All exploration to date shows that this is an achievable goal. The Army decision on single pilot for LHX will be finalized next year after the critical Advanced Rotocraft Technology Integration (ARTI) demonstration and flight experiments have been completed and the Cost and Operational Effectiveness Analysis results are available.

Questions Submitted by Senator Patrick J. Leahy

SINCGARS/VRC-12

Senator **Leahy**. The Department of the Army is in the process of replacing VRC-12 tactical radios with the new SINCGARS series. Although the VRC-12 series has been in the Army inventory for almost two decades, I understand that Reserve component requirements have still not been fulfilled. For example, in my own state of Vermont, the Mountain Warfare Battalion is short 27 radios. Under the Army issue plan for the SINCGARS, will displaced VRC-12 tactical radios be distributed expeditiously and systematically to fill valid Reserve component requirements? Are there plans to divert the VRC-12 series radios to FMS before Reserve components, including the requirements of the Vermont National Guard, are filled.

General **Wagner**. The 172nd Mountain Warfare Battalion was reorganized under a Force Activity Designator IV in October 1984. The unit is in process of ascertaining on hand equipment status from the various company level units which will make up the 172nd. Identification of equipment shortages will be provided to the National Guard Bureau. The National Guard Bureau plans to provide assets to meet 172nd training requirements from reported excess. Remaining shortages will be filled through normal Army supply channels based on readiness requirements and priority of units. SINCGARS fieldings are scheduled to being in FY86; however, significant quantities will not be fielded until FY88. Those AN/VRC-12 Family of

Radios which are displaced by SINCGARS will be redistributed to fill shortages in the Active and Reserve Components. There is no commitment at the present time to divert radios displaced by SINCGARS to meet FMS requirements.

81MM/60MM MORTARS

Senator **Leahy**. What are the current shortfalls in authorized 81mm and 60mm mortars for National Guard and Reserve Units? What are the Department of the Army's plans for fielding such shortfalls?

With the authorization of the Department of the Army, the Vermont National Guard is currently recruiting and filling mortar units for its new mountain battalion. Thus far, there has been no indication from the Department of Defense that mortars necessary for training will be forthcoming. When does the Army intend to provide Vermont's Mountain Battalion the six 81mm and nine 60mm mortars which it is authorized but does not currently have, so that critical training may take place under reasonably realistic conditions.

General **Wagner**. A review of current 81mm mortar and 60mm assets reflect that there are sufficient mortars in the Army inventory to satisfy mortar requirements. There are no shortfalls within the Army National Guard regarding the 81mm mortars. There is currently an action ongoing to redistribute six 81mm mortars from the Louisiana National Guard to the Vermont National Guard to meet the mountain battalion requirements. The decision to field the 60mm Lighweight Company Mortar System (LWCMS) to Light Infantry, Airborne, Air Assault and Mountain Battalions was made on 10 September 1984. The Army currently has sufficient 60mm LWCMS on hand to satisfy total Army requirements. The Vermont National Guard Mountain Battalion is currently short 60mm LWCMS. Each of the three companies in the Vermont National Guard Mountain Battalion have initiated requisitions to obtain their authorized 60mm LWCMS. The Vermont National Guard Mountain Battalion will receive 60mm LWCMS in accordance with the established priority listing. This unit is designated a FAD IV category which places it relatively low in the distribution priority.

Senator **Leahy**. The 10th Division is now being organized at Fort Drum, New York. Until the decision to base the 10th Division there, Fort Drum had been dedicated to Reserve Component training. What effect will the introduction of the 10th Division to Fort Drum have on Reserve Component training? What steps are being taken to ensure that the Reserve Component units will have adequate access to necessary range and training areas during their annual exercises? Does the Army plan to purchase new lands for range and training areas? If so, what funding will be required in fiscal years 1986–1990? Have such funds been requested? If not, when will they be?

General **Wagner**. The activation of the 10th Mountain Division (Light Infantry) will not have an adverse impact on Reserve Component training at Fort Drum. Training areas and ranges are adequate to meet the training requirements of Reserve Component units on the installation. Fort Drum has had a reduction of 1,000 billet spaces available for units to live in barracks because of the 10th Mountain Division (Light Infantry) stationing. At present, Fort Drum can accommodate approximately 6,000 troops in garrison in addition to the 10th Mountain Division (Light Infantry). This reduction limits the number of troops that are able to live in garrison but does not preclude units from living in the field during their training period at Fort Drum. The change in billet space did result in rescheduling of some Reserve Component units training for fiscal year 1985. A series of meetings were held at Fort Drum between First United States Army and Reserve Component representatives to resolve scheduling conflicts.

The Army has no plans to purchase new lands for ranges or training areas at Fort Drum. However, the 5-year range upgrade program will address all anticipated range and training area requirements.

RESERVE COMPONENTS DISTRIBUTION

Senator **Leahy**. The Department of the Army is in the process of replacing its quarter ton trucks with HMMWV and CUCV vehicles. It is my understanding that many Reserve Components, including Vermont's, are suffering serious shortages of quarter ton trucks. In what manner and according to what schedule will displaced Active Army Component wheeled vehicles be distributed to Reserve components? Are there plans to divert the displaced quarter ton trucks to FMS before Reserve Component requirements are met?

General **Wagner**. Current Army policy is to provide equipment to first to fight units. This policy is inclusive for active and reserve component units. Additionally the Army's modernization program includes providing new equipment to the reserve components. While it is true the HMMWV and CUCV are displacing quarter ton trucks in the active component, this is also taking place in the reserve components. Redistribution of displaced quarter ton trucks will be accomplished Army-wide (active and reserve component) based upon requirements in DAMPL priority. Present plans are to fill all existing quarter ton requirements including War Reserves prior to considering this item for FMS.

NIGHT VISION DISTRIBUTION—RC

Senator **Leahy**. My review of Vermont Army National Guard equipment stocks indicates that there is a shortage of over 450 pairs of night vision goggles (ANPVS-5 and ANPVS-4). This shortage prevents adequate training in night combat techniques and reduces combat readiness. Can the Army identify and earmark funds in fiscal year 1986 to procure a sufficient number of night vision goggles to meet at least the minimum training requirements of the Vermont Army Guard units? What is the Army's plan, by fiscal year for meeting the full operational requirements of the entire Guard, including all relevant Vermont elements, for night vision goggles and other equipment uniquely designated for night combat?

General **Wagner**. Shortages in night vision equipment exist throughout the Army. The status of the units in Vermont reflect those shortages and the Army's priorities for distribution. Distribution to Army National Guard units is generally based upon deployment criteria, with early deploying units receiving equipment ahead of those that deploy later.

The Army does have a program to provide minimum essential equipment to Reserve Component units to support training. A total of 221 night vision devices are required for Vermont Army National Guard units in conjunction with this program.

The Army identifies funds to procure toward an acquisition objective based upon projected war time requirements. Over the next five years the Army will procure approximately 98,000 Night Vision Goggles and 22,500 Individual Weapons Sights against requirements of 206,671 and 81,360 respectively. A portion of the new procurement will be distributed to the Army National Guard to support both operational and training requirements.

TACFIRE-RC

Senator **Leahy**. General Wagner, the Army Field Artillery School is currently teaching all students on modern fire direction equipment (Tacfire). At the same time, most National Guard units, including the Vermont Guard, are equipped only with obsolete fire direction equipment. I understand National Guard officers attending the Artillery School do not get trained on computer fire direction equipment. When will the Department of Defense revise the Basis of Issue plan for Tacfire to incorporate at least one piece of computer fire directional equipment to National Guard units for training purposes?

General **Wagner**. Senator Leahy, the Field Artillery School teaches all officers that require it, including National Guard Officers, automated (computer) fire direction procedures. As an example, to support the National Guard training on the Battery Computer System (BCS), the Field Artillery School teaches the BCS (RC) Cadre course. This course is 80 hours long.

Tacfire is being fielded to the Active Army heavy divisions and to the three National Guard round-out Field Artillery Battalions. Tacfire training is proved to all personnel assigned to those units that require it. As you known the House Appropriations Committee directed termination of the Tactical Fire Direction (Tacfire) program in 1979, expressing concern about the use of obsolete equipment while encouraging the use of modern technology to provide automated capabilities. Recognizing the dynamic strides of the computer industry and the rapid changes in technology, the Committee directed no modular improvement program for Tacfire and reemphasized the pursuit of a modern, responsive and cost effective successor to Tacfire. At the same time, Congress approved funds for AFATDS. AFATDS will be fielded to the total force.

The Battery Computer System (BCS), a modern automated fire direction system, is being fielded to all field artillery batteries; Active, National Guard and Reserve.

DEFENSIVE CHEMICAL EQUIPMENT

Senator **Leahy**. Although individual protective equipment for personnel survival in a chemical attack is given high priority by the Army for the active survival of forces, such defensive equipment has not been made available to the Reserve Components on a timely or sufficient basis. In Vermont, there is a serious shortfall of chemical and biological mobility equipment that has been authorized but not delivered. In addition, the Vermont Guard completely lacks 87 Alarm Chemical Agent Detection sets which are critical for survival on the modern battlefield.

Are such shortages specific to Vermont, or does this problem exist throughout the Reserve Components nationwide? Is there sufficient funding in the Department of the Army fiscal year 1986-1990 plan to redress these defensive chemical equipment shortfalls in the Reserve Components, and specifically for the Guard in Vermont?

Dr. SCULLEY. Since fiscal year 1982, ARNG stock funded Chemical Defense Equipment (CDE) on hand has increased from approximately 10 percent to 50 percent of total requirements. This equipment includes individual protective equipment, detection, and decontamination kits.

The NGB has spent $50M since fiscal year 1982 for procurement of CDE with the majority for contingency assets in high priority units (D to D+30). Vermont has no high priority units, but was provided $119,000 specifically for CDE training assets. Current policy is to equip early deploying units (D to D+60) with contingency assest in fiscal year 1986. The long range goal is to provide all units having a mobilization mission with contingency assets and provide sufficient CDE for training by fiscal year 1987. The stock fund CDE program (OM & OMNG) for the Reserve Components provides funds for initial training issues, replacements for items consumed in training, shelf life expired items, and contingency/readiness issues for early deploying forces. Plans are to complete total initial issue for USAR and ARNG in fiscal year 1987.

Chemical Defense Equipment, in addition to stock funded chemical protective overgarments, addressed above, also includes procurement appropriation funded items such as protective masks, decontaminating apparatus, radiac meters and chemical agent alarms. Chemical Defense Equipment is distributed based upon the unit's priority of deployment and the need for the item of equipment for mission accomplishment. Within the ARNG the fill rate for protective masks and decontaminating apparatus is 100 percent, as is the case in Vermont. The fill rate for radiac meters is 40 percent ARNG-wide, while it is 28 percent in Vermont. Chemical agent alarms are at a fill rate of 43 percent in the ARNG, while the fill rate in Vermont is 23 percent. In view of the lack of high priority units in Vermont and the current Army equipment distribution policy, the CDE fill rates within Vermont are in consonance with unit priorities and the readiness reporting requirements. Within the USAR the fill rate for chemical agent alarm kits is 54%. This percentage is in line with the readiness level of units concerned.

[Whereupon, at 11:58 a.m., the committee adjourned, subject to the call of the Chair.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1986

THURSDAY, MARCH 7, 1985

U.S. SENATE,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

NAVY TACTICAL PROGRAMS

The committee met in executive session, pursuant to notice, at 9 a.m., in room SR-222, Russell Senate Office Building, Senator Barry Goldwater (chairman) presiding.

Present: Senators Goldwater, Thurmond, Warner, Humphrey, Cohen, Denton, Nunn, Hart, Kennedy, Bingaman, Dixon, and Glenn.

Staff present: James F. McGovern, staff director and chief counsel; Arnold L. Punaro, staff director for the minority; Alan R. Yuspeh, general counsel; Jeffrey H. Smith, minority counsel; William E. Hoehn, Jr., George K. Johnson, Jr., David S. Lyles, José E. Martinez, Carl M. Smith, Jon Etherton, John J. Hamre, professional staff members; and Inga B. Schoonover, staff assistant.

Also present: Gerald J. Smith, assistant to Senator Goldwater; Les Brownlee, assistant to Senator Warner; Phil Upschulte, assistant to Senator Glenn; James H. Dykstra, Dale F. Gerry, assistants to Senator Cohen; Bernard R. Toon, assistant to Senator Quayle; John Roddy, assistant to Senator East; William S. Lind, Janne E. Nolan, assistants to Senator Hart; James Steinberg, assistant to Senator Kennedy; Edward McGaffigan, Jr., assistant to Senator Bingaman; Charles C. Smith, assistant to Senator Dixon; Alan Cameron, assistant to Senator Denton; John Rasmussen, assistant to Senator Gramm.

OPENING STATEMENT BY SENATOR BARRY GOLDWATER, CHAIRMAN

Chairman GOLDWATER. The meeting will come to order. This morning the committee meets to receive the testimony from the Navy and the Marine Corps on the tactical programs in their 1986 budget.

To present this testimony are Vice Adm. Edward H. Martin, Deputy Chief of Naval Operations for Air Warfare, Department of the Navy, and Lt. Gen. Keith A. Smith, Deputy Chief of Staff for Aviation, Headquarters, Marine Corps.

Both Admiral Martin and General Smith, while appearing before the committee for the first time in their current assignments, bring a very important perspective to the defense budget. They both have recent operational experience. Admiral Martin commanded the 6th Fleet up until just last month, and General Smith commanded the Second Marine Aircraft Wing, Fleet Marine Force Atlantic, until September of last year. Such experience is a very valuable, but perishable, commodity here in Washington.

I was reading an old book on warfare the other day that was listing the ingredients needed for successful combat operations. And it started off, of course, with manpower, and it went into equipment and it went into this, that, and the other thing. And finally, the major lubricant, the one that is never available, is combat experience.

So we are very glad to have you gentlemen onboard, particularly in this year when we are going to have a little combat of our own over here.

I hope that today as you discuss the strengths and needs of the Navy and Marine Corps—and I just mention Marine Corps and who pops in.

Senator GLENN. Yes, sir.

Chairman GOLDWATER. You will not resist being influenced by your recent experience.

I would also like to welcome Vice Adm. James B. Busey, Commander, Naval Air Systems Command, and Rear Adm. Kendall Moranville, Director, Aviation Plans and Requirements Division.

Gentlemen, it is a pleasure to have you with us this morning and we are looking forward to your testimony. And I would like to ask our Marine representative, John Glenn, if he might have a few words.

Senator GLENN. I do not have any comments, Mr. Chairman. Thank you very much.

I am glad to see everybody again here this morning. I am a new member on the committee, but it is not that I have not followed some of these matters through the years whether I was on the committee or not. So I am glad to be on the committee. I am glad to be working with you.

Thank you, Mr. Chairman.

Chairman GOLDWATER. Gentlemen, you both have written statements. You may read these if you care to or they will be printed in the record as if read and we can get along with your discussions and then whatever questions might come out of the committee on those statements.

So, let us see, we will start off with you Admiral Martin, the head man.

STATEMENT OF VICE ADM. EDWARD H. MARTIN, USN, DEPUTY CHIEF OF NAVAL OPERATIONS—AIR WARFARE, ACCOMPANIED BY VICE ADM. JAMES B. BUSEY, USN, COMMANDER, NAVAL AIR SYSTEMS COMMAND, AND REAR ADM. KENDALL E. MORANVILLE, USN, DIRECTOR, AVIATION PLANS AND REQUIREMENTS DIVISION

Admiral MARTIN. Thank you, Mr. Chairman, and good morning.

Mr. Chairman and distinguished members of the committee: I welcome this opportunity to be here today to discuss with you my views on the state of naval aviation and the direction we intend to pursue in the future.

General Smith and I indeed do have detailed statements, which we respectfully request be entered into the record. In addition, I would like to discuss with you several issues which I believe will be of interest to the committee. General Smith then will discuss Marine Corps aviation.

General Smith, Admiral Busey, and I, of course, are ready to answer your questions at any time.

This is my first appearance before your committee. In fact, I have been in Washington just 1 week, after having returned from command of the 6th Fleet. I am not as versed in many of the intricacies of all these programs, and therefore we have a lot of backup assistance, as may be required.

From my experiences in the 6th Fleet and those gleaned since I have been back in Washington, I know that the state of naval aviation is, in one word, "better." We are better equipped, we are better manned, and we are better prepared than we were just a few short years ago, thanks largely to you, this body, the administration, and the Defense Department.

Mr. Chairman, I think you stated the case very effectively not too long ago when you said that the problems we have largely overcome are "achievements we should build on, not use as an excuse to do less." In naval aviation we have accomplished much in these last few years, but we have much to do, and we request and need your continued support.

Before I get too involved, I would like to share with you some very good news over this past year, and in my opinion this is a direct result of the support here. This is our safety record. 1984 was the safest year in naval aviation history. It was the fourth year in a row in which we reduced both the number and the rate of major mishaps.

In 1984 we had 3.31 mishaps per 100,000 flight hours. Mr. Chairman, I would like to make a comparison. That is 3.31 mishaps per 100,000 flight hours. When I started flying 31 years ago in 1954, that rate was 50.54.

AVIATION SAFETY

RECENT YEAR COMPARISON

	CALENDAR YEARS			
	1981	1982	1983	1984
MISHAPS	95	90	88	69
RATE/100,000 FLT HRS	4.83	4.46	4.33	3.31

Moreover, in 1954 we had 536 fatalities in naval aviation. The cost of the mishaps has declined in the last few years, and just compared to last year, has dropped by $188 million. The really good news is that fatalities are down by 20 percent. Those savings in valuable dollars and priceless lives are a tribute to the airplanes we operate, to the dedication and skill of those who fly, those who maintain, and those who support them.

Chairman GOLDWATER. Could I interrupt just a moment while you are on that subject. General Smith, what is your AV-8B accident rate now?

General SMITH. The AV-8B has just passed 5,000 flight hours with no accidents. The rate for the AV-8A is about 6.3.

Chairman GOLDWATER. Now, the AV-8A accident rate was running very high, and I know that you made some changes in the flight requirements, experience and so forth. And it is now beginning to pay off?

General SMITH. Indeed it is. One of the big things that was done was to add the two-seat TAV-8A for the initial flight training of students out of the training command, and also for conversion pilots. The AV-8A rate is coming down, and of course the AV-8B is a far simpler airplane to fly with a reduced cockpit workload during V/STOL flight.

Chairman GOLDWATER. Thank you.

Admiral MARTIN. Mishap rates of course reflect only noncombat statistics, and I am very pleased that those are the only statistics we have this year. In 1984 naval aviators fired not one missile or bullet, they did not drop any bombs, in anger, and obviously we all hope to continue this in the future, in 1985, 1986, and beyond.

Mr. Chairman, I feel our best insurance to continue this trend, and to deter aggression and thereby avoid conflict, is to be well prepared, with resolve. The budget request you have before you represents our balanced, considered plan to make naval aviation the most ready, efficient, and cost effective it has ever been.

This year's fiscal year 1986 request addresses our force level requirements and, as we expand to a 600-ship, 15-carrier battle group Navy and a three Air Wing Marine Corps, it responds to our pressing requirements to make these forces the most modern and capable possible.

The President's fiscal year 1986 budget addresses the key elements of both readiness and sustainability, and it is no surprise to you or to the American people that such preparations—the major weapons systems, the spare parts, the fuel, and the people—are tremendously expensive. And I assure you, sir, that recognizing the reality of high expenses and budgetary dilemmas, we have not simply rolled over and acquiesced to these huge budgets.

Quite the contrary. We have and will continue to carefully analyze, review, appraise, and scrutinize every dollar that goes into the requests we submit. We will work hard to do that because each of us at one time or another has operated in a fleet when that one spare part was unavailable, a part which would have gotten the airplane into the air and on its way to accomplish a mission, or when there were not enough trained technicians to maintain our very sophisticated aircraft. We do not want to be in such a position again. Our fiscal year 1986 request reflects our efforts to this end.

There has been much discussion in the media and here on the Hill about priorities, about the balance between big ticket items and spare parts. We in naval aviation have been accused of acquiring all possible of the former at the expense of the latter, of worshipping modernization and increased force levels to the detriment of both readiness and sustainability.

Let me take just one example to illustrate the provincialism of those arguments. The much maligned F-18 Hornet is a classic example of modernization which makes impressive contributions to both readiness and sustainability. It has begun to replace both the A-7 Corsair and the F-4 Phantom in our carrier and Marine air wings.

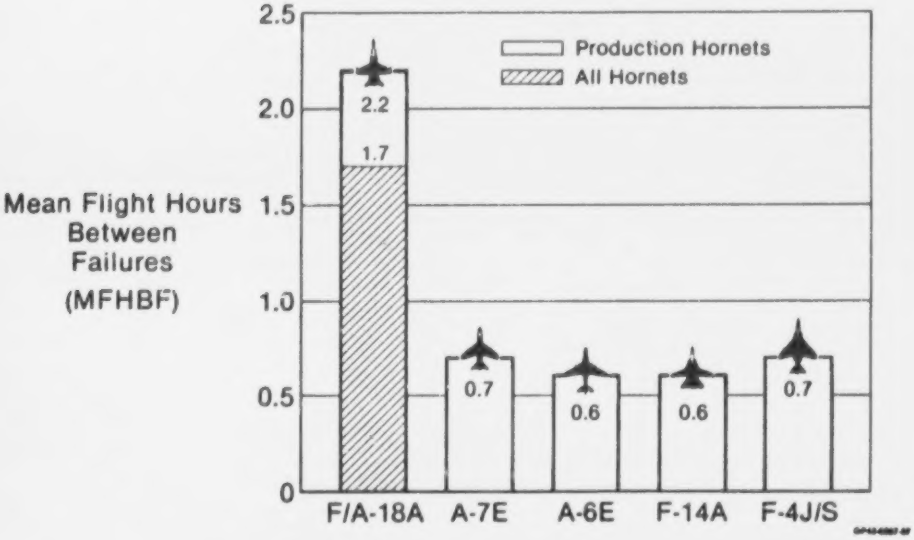
As we continue to operate the F/A-18's, some startling, impressive results emerge. Two important measures of an airplane's capabilities are maintenance manhours per flight hour, which is a measure of the effort required to keep it in the air, and mean flight hours between failure, which is a measure of reliability.

During 1983 the maintenance manhours per flight hour for the A-7 and the F-4 were 46.1 and 51.6 respectively. On the other hand, for the F/A-18 the figure was an impressive 26 hours. That's a reduction by almost half. The mean flight hours between failure statistics were equally impressive.

Hornet Reliability 3 Times Better Than Other Fleet Aircraft

3M Data

January 1983 - December 1983



While the F-4 and the A-7 experienced only seven-tenths of a flight hour as the mean flight hours between failures, the F/A-18 achieves a remarkable 2.2 hours between occasions of required corrective maintenance, and this is an unprecedented 300 percent improvement.

As a result, the aircraft are ready to launch a higher percentage of the time, they work better on the job, and when they get back they are ready to go again. This equates to readiness, and it also means sustainability. Moreover, on a 1-for-1 replacement basis it means increased force levels, because the introduction of the strike fighter gives the carriers more fighters for defense and more capability for offense than provided by the heretofore conventional carrier air wings.

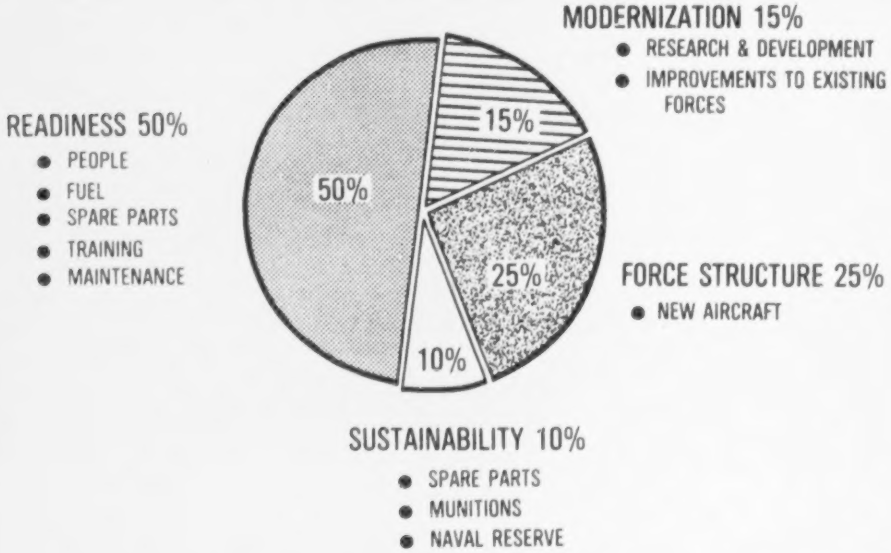
Chairman GOLDWATER. Let me ask you a quick question there. Would that chart be radically changed if you had adequate spares? What I am trying to get at, you have got a good record on the F/A-18. Does the fact that you have a good supply of spares influence that record, and does the fact that you might not have a good supply of spares on, say, the A-7 affect their low record?

Admiral MARTIN. Well, sir, of course the more spares one has when needed the better that record will be, obviously. But we are providing a better spare parts profile now than we ever have in the past. Also, the F/A-18 was designed with a lot of the reliability and maintainability in it. We are looking at improving our maintenance manhours per flight hour and our mean flight hours between failures in all of our systems, and I think we are making strides in that by management techniques and procedures, by the distribution of spares, and by the training of our personnel.

The more of these capable F/A-18 aircraft we obtain, the higher our preparedness to accomplish the mission, the greater our ability to persevere. The entire aircraft procurement Navy, or APN, account which you will consider is designed to make those same contributions to the readiness and sustainability of all of our naval aviation forces.

These are key ingredients to our planning, tied closely to affordability.

NAVAL AVIATION FY86



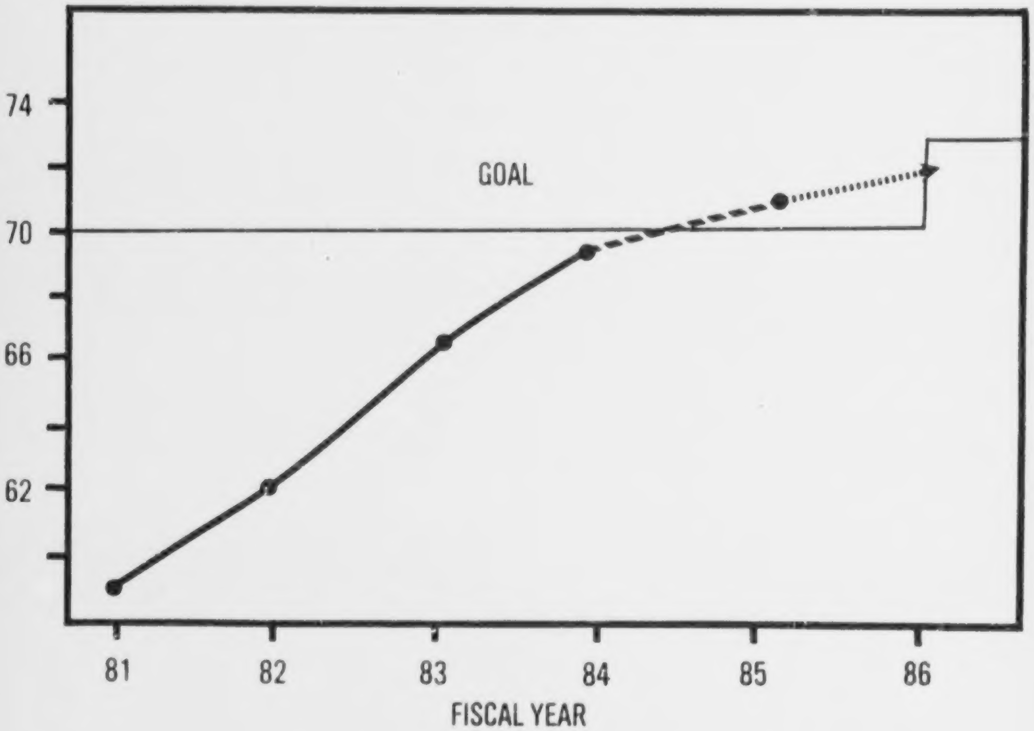
Among my major concerns is ensuring that the funds we request for naval aviation are properly distributed across the four pillars of force effectiveness. Particular attention is paid to achieving a proper balance in the procurement and operating accounts. In fiscal 1986 we are apportioning 60 percent of our resources into improvements to both readiness and sustainability, without compromising our attention to modernization and force structure. So indeed, 60 percent of our effort is going into the readiness and sustainability area.

However, we have not ignored the other key ingredients of the readiness and sustainability equations. Our investment in spare parts and support equipment is indeed keeping pace. For example, I recently received a message, Mr. Chairman, which highlighted a significant achievement in engine maintainability. At one of our master jet air bases on the east coast, for an entire week period not a single aircraft had a bare firewall awaiting a replacement engine. This is a huge improvement over our situation during the last several years.

We could not have made that statement before at any air station or indeed aboard any of our carriers.

While we have made significant progress, we have not fully recovered in meeting our engine support requirements. In short, our investments in engines, engine repair parts, and engine support equipment are paying off. This is due in no small measure to your strong support and interest in this area. All of this is reflected in the state of our naval aviation forces today.

TOTAL FORCE
MATERIEL READINESS (MC)



One measure of material readiness is what we refer to as the aircraft mission capable, or MC, rate. Our goal is the rate of 70 percent MC, and this means that each aircraft is capable of launching and accomplishing its assigned mission not 70 percent of the time it is called upon to do so, but 70 percent of each 24 hour day.

This allows for routine maintenance, which any sophisticated system requires, particularly when operating in the demanding environment of an aircraft carrier. As a fleet commander, this sustainability and readiness measure, or mission capable rate, was of very great concern to me, and I am still most interested. Before I came over this morning I looked at the message traffic, and on three deployed carriers—the U.S.S. *Constellation,* the U.S.S. *Midway,* and the U.S.S. *Carl Vinson*—the lowest of those three carriers had an 80 percent mission capable rate. That is to say, the lowest of the three aircraft carriers would be capable of providing mission accomplishment with 80 percent of her embarked aircraft during the reporting 24 hour day.

The goal of 70 percent that we have established is attainable. In fact, we are almost there. In 1983 we achieved a 66-percent MC rate. This time last year we predicted a 67-percent MC rate for

1984, and we achieved 69.5. Our projection for 1985 approaches 71 percent. As a result, our goal for fiscal 1986 now has been raised to 73 percent, and our budget reflects this objective. And with your continued support in this area, I think we will achieve this.

Our program to maintain aircraft inventories with the proper mix and in the right numbers to support the growing Navy was sustained in 1984. Over 280 aircraft entered the fleet, including the F-14A, F/A-18A, A-6E, EA-6B, E-2C, and P-3C aircraft.

Approximately 275 aircraft will enter the fleet in 1985. Aircraft procurement for fiscal year 1986 will continue the effort to modernize the force and reduce its age, with 322 total aircraft requested. That number, which was arrived at after very meticulous attention and cost effective procurement procedures and strategies, is a net reduction of 86 aircraft from our plan at this time last year * * *. And, sir, every single aircraft is necessary. In our fiscal year 1986 procurement request, we have exerted every effort to achieve a balanced and affordable program. In many cases we would like to increase the units requested to satisfy requirements and to reduce the costs. This, of course, is in the interest of achieving a balanced program in a tight fiscal environment.

However, if we have to take further cuts we will increase the cost of aircraft significantly by reducing production rates.

Fiscal year 1986 marks several important milestones in naval aviation. Fiscal year 1986 is the last procurement year for the F-14A incorporating the TF-30 engine. Beginning with fiscal year 1987, the F-14A will have an operationally superior engine, the General Electric F-110. In fiscal year 1988 we will begin procurement of the vastly superior F-14D.

Also, 1986 marks the first production year of the CH and MHc-53E as a multi-year procurement program. This year we are requesting 4 CH-53E's and 10 MH-53E's and this is a multi-year procurement program. The MH-53E will be the mainstay of our airborne mine countermeasures force, replacing the older and less capable RH-53D.

AGE OF AIRCRAFT INVENTORY

Even with all of this, we still have a serious problem with the age of our aircraft inventory. Today, 66 percent of our aircraft are more than 10 years old and 50 percent, fully half, are over 15 years of age. This is a matter of grave concern.

We need to increase our aircraft procurements in the future to ensure a modern, effective naval aviation force structure, in order to counter the threat which is growing ever younger, ever more sophisticated, and ever more capable.

In naval aviation, we are acutely aware of the fiscal realities of our time. Accordingly, we try to husband the taxpayers' dollars wisely by investing in the modernization and longevity of our existing aircraft, through modifications and reworks.

Important items in the fiscal year 1986 modification program include the integration of the Harm missile into the A-6, incorporation of survivability and vulnerability improvements in several combat aircraft, structural improvements in the F-14; H-46 safety, reliability and maintainability update; SH-3 SLEP, or service life extension program; S-3 weapons systems improvements, and ALQ-126B kit procurement.

Also, beginning with fiscal 1986, the E-2C will receive an upgraded engine which will improve flight safety and provide additional power for increased aircraft gross weight.

An important element of sustainability is the daily and worldwide contribution that our Naval Reserve aviation forces make to the defense of the Nation. Fully one-third of our ASW patrol aircraft squadrons are in the reserve forces. The Naval Air Reserve Force has embarked on an ambitious modernization program, with both of its carrier air wings slated for transition to state of the art aircraft—the F-14, the F/A-18, A-7E, and the E-2C.

The first reserve E-2C squadron is now in place. Also, a reserve squadron in San Diego accepted its first F-14 in October 1984. F/A-18 transition for reserve air crews and maintenance personnel has been underway in Lemore, CA, for the last year. In fiscal year 1986, this reserve squadron will receive its own aircraft and be able to mobilize if necessary.

A-7E transition of one squadron in fiscal year 1985 and two squadrons in fiscal year 1986 will complete the program update from the A-7B.

Helicopter ASW support for frigates of the Naval Reserve Force will be provided by a total of three Lamps Mark I squadrons, one in San Diego, one standing up this year on the East Coast, and a third to be commissioned in fiscal year 1986.

The Navy's only combat SAR, [Search And Rescue] squadron, is based in San Diego, and this squadron will evaluate the two UH-60 aircraft authorized by Congress last year.

This year we retire our remaining C-118 aircraft and complete our airlift modernization by purchasing the final increment of used DC-9's for our reserve air transport squadrons.

The statement I have submitted for the record contains detailed information on each aircraft for which we have requested procurement, and the backup books submitted to your staff contain more. For the benefit of this committee, I will briefly discuss the highlights of a few key programs which are fundamental to continued and viable Navy tactical air forces.

Senator DIXON. Mr. Chairman, if I might interrupt. I apologize to the Admiral. The Mayor of Springfield is coming to another committee in a few minutes and I have to go introduce him.

May I put a statement in the record?

Chairman GOLDWATER. Certainly. Have you a prepared statement?

Senator DIXON. Yes, and I have given it to the reporter.

[The prepared statement of Senator Dixon follows:]

PREPARED STATEMENT BY SENATOR ALAN J. DIXON

Thank you Mr. Chairman, I am looking forward to hearing Vice Admiral Martin and General Smith this morning, because I am greatly concerned over the low production rates of Navy and Marine Corps tactical aircraft.

The Navy today has 10 major combat aircraft production lines operating. Four of these lines are producing at below economic rates and three others are just at the break even point. Because of this, the Government is paying more money than necessary for combat aircraft.

So a major question I have regarding combat aircraft production is: Do we cut some of these uneconomical lines or do we increase production to gain a better return for our dollar?

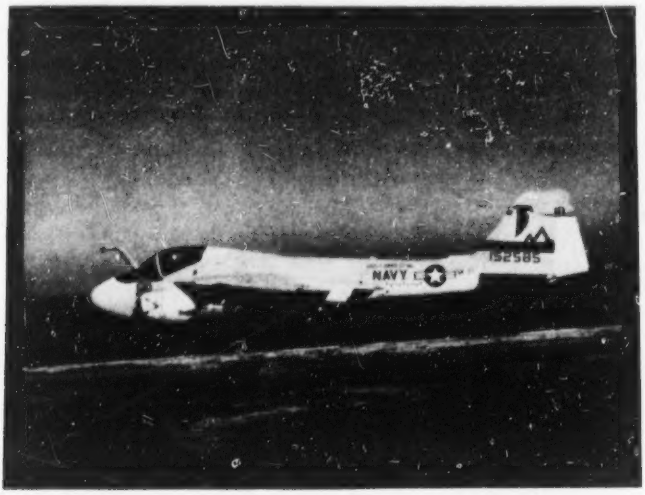
I think this problem is one of setting our priorities: Have we perhaps spent to much money on the Navy's shipbuilding accounts and not enough in our naval aviation accounts?

We in this committee are faced with the fact that the Defense budget increases must be reduced. Do we reduce by cutting back our conventional programs such as the naval aviation and shipbuilding accounts or do we reduce our strategic weapon accounts?

I hope today's hearing will shed some light on the subject of how best to spend our country's limited economic resources.

Thank you Mr. Chairman.

A-6E INTRUDER



- All Weather Day/Night Medium Attack Aircraft
- Target Recognition Attack Multisensor (TRAM)

Admiral Martin. The A-6E shown here is our all-weather attack aircraft, which Navy and Marine squadrons operate from aircraft carriers and shore stations. It has impressive capabilities against a variety of shore and seaborne targets, day or night, in good or adverse weather conditions.

The A-6E incorporates infrared sensors and has laser ranging and designating capabilities for use with our most sophisticated laser-guided weapons.

A-6F

- IMPROVED WEAPON SYSTEM PERFORMANCE
  - HIGH RESOLUTION DOPPLER BEAM SHARPENED RADAR
  - AIR-TO-AIR CAPABILITY
- IMPROVED RELIABILITY/MAINTAINABILITY
  - DIGITAL AVIONICS (OFF-THE-SHELF)
  - NEW ENGINE OFF-THE-SHELF)
- INCREASED SURVIVABILITY
  - FIRE/EXPLOSION SUPPRESSION

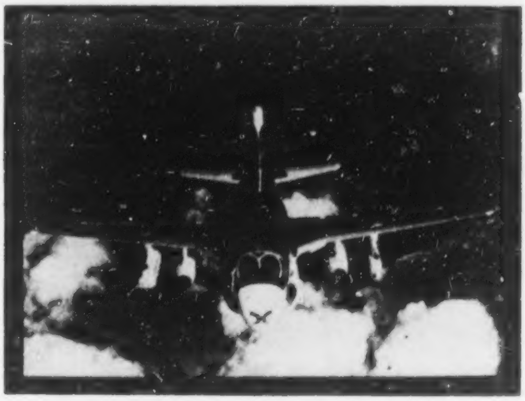
A vastly improved version of this workhorse aircraft is currently under development. This is the A-6F. The A-6F will incorporate state of the art technology. Some of which is derived from the F/A-18, which will provide a quantum improvement in its capabilities, enabling the A-6 to meet and beat the projected threat for many years in the future.

We have initiated concept development on an advanced tactical aircraft which will ultimately replace the A-6, but this aircraft will not come into service until the end of the next decade.

Recently we discovered that the fatigue life of the A-6 wing will not exceed the contract specifications, as had been hoped. We hoped that the wing life could be extended as much as 100 percent, to 4,400 hours. This was not possible and, in examining alternatives, we are entering into a competition for the design and production of a new wing. The new wing will be incorporated in new production A-6E's and A-6F's. Also, this new wing will be capable of retrofit into existing airframes. Our goal is a 4,400 hour wing available in 1988.

Our A-6 inventory currently stands at 353 aircraft, and our fiscal year 1986 request is for six aircraft, with a unit fly away cost of $21.6 million.

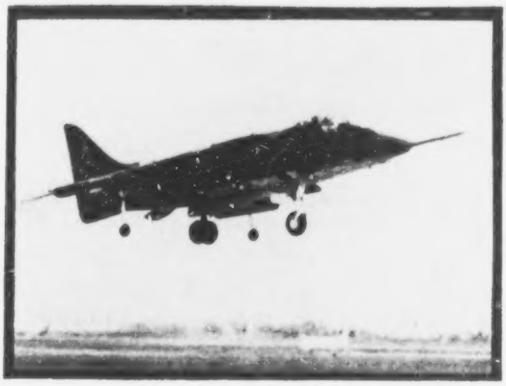
EA-6B PROWLER



- Suppression and Degradation of Enemy Defense Systems by Tactical Jamming
- Passive Early Warning for Fleet Defense and Battlefield Electronic Surveillance
- Total Program 173

Our electronic countermeasures aircraft, the EA-6B, which is designed for carrier and advanced base operations is flown by both the Navy and the Marine Corps. Its missions include support of strike aircraft and ground troops and defense of a battle group by tactically jamming the enemy's electronics systems and capabilities. We have 76 EA-6B's in the force today, and our fiscal year 1986 request is for 12 aircraft, at a unit fly-away cost of $23.5 million.

AV-8B HARRIER



- Improved Vectored Thrust V/STOL Aircraft
- Increased Weapon Delivery Accuracy with Angle Rate Bombing System (ARBS)
- Light Attack Aircraft Operating from Austere Forward Sites in Support of Ground Troops
- Total Program 334

The AV-8B Harrier. This is an improved version of the original Harrier, and General Smith will discuss it in more detail. Our inventory of the AV-8B is 20, with 77 more funded but not delivered. The fiscal year 1986 request is for 46 AV-8B's at a unit fly-away cost of $16.6 million.

Senator HART. Mr. Chairman, could I ask a question?

Chairman GOLDWATER. Sure.

Senator HART. Admiral, could I ask you the status of the AV-8B plus program?

General SMITH. The AV-8B, like any other airplane being procured is constantly being reviewed for increased capability. As far as a concise statement of where that program stands, we would prefer to submit it for the record.

Senator HART. If you would. That is a program the committee has been interested in, as you know, for the past several years, encouraging enhanced capability of that aircraft, and I think we would be very interested in where that program stands, particularly from the Marine Corps point of view.

General SMITH. We would be happy to do that, sir.

[The information follows:]

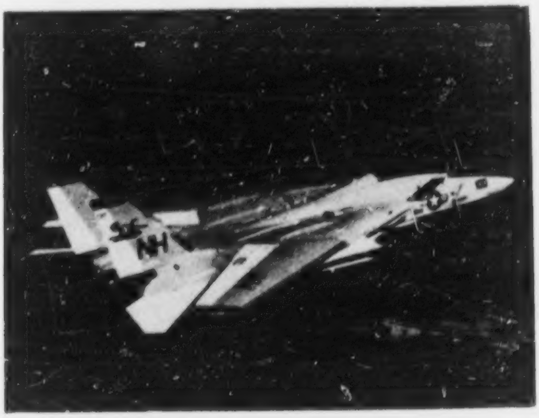
AV-8B+ PROGRAM

The final portion of a two year NAVAIR contract dated 16 September 1983 will conclude this summer. MCAIR will evaluate through simulation the air-to-air and air-to-ground capabilities of an AV-8B with a candidate radar in place of the present Angle Rate Bombing System. The simulation effort is scheduled to complete in June 1985 with a report to NAVAIRSYSCOM to follow.

It must be stated that the USMC presently has no requirement for a radar in the AV-8B. Marine aviation remains interested in evaluating improved capabilities for existing platforms that appear cost effective.

The primary concern with a radar for the AV-8B is the weight increase which reduces vertical landing performance, and the increased support requirement normally associated with a radar aircraft.

F-14A TOMCAT



- **Air Superiority/Fleet Air Defense**
- **All Weather Capability with PHOENIX and SPARROW**
- **Close-In Air-to-Air Combat with SIDEWINDER and M-61 GUN**

Admiral MARTIN. The F-14A Tomcat, this is our highly capable maritime air superiority fighter. It employs the sophisticated AIM-54C Phoenix missile against the long-range air threat. It also carries the AIM-7 Sparrow and the AIM-9 Sidewinder missiles, which are for medium and short-range combat, respectively. The F-14 also has a self-contained gun capable of firing about 6,000 rounds per minute.

The F-14 has experienced some engine problems over the years. Consequently, we are procuring a new engine to cure those shortcomings. The General Electric F-110 will replace the currently used TF-30 engine, beginning with the last F-14 procured in fiscal year 1986. We will also install the F-110 engine in the F-14D, which represents a major upgrade of the airplane's current capabilities.

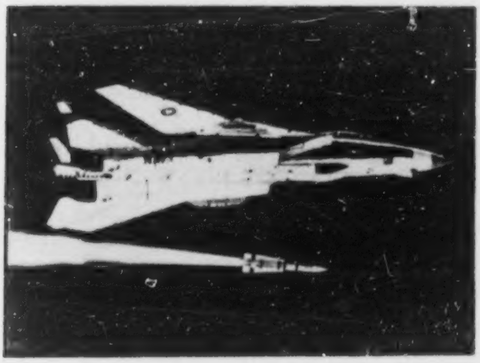
F-14D

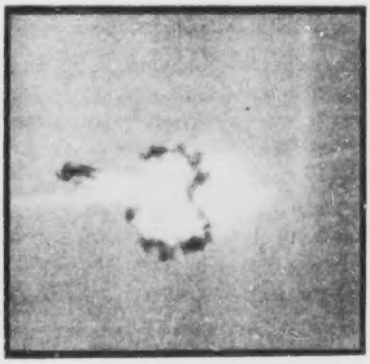
- F 110 GENERAL ELECTRIC ENGINE
  - OPERABILITY
  - RELIABILITY/MAINTENANCE
  - PERFORMANCE
- AVIONICS
  - DIGITAL
  - FUTURE INTEGRATION
  - COMMONALITY
- RADAR
  - ECCM
  - IRST

In addition to the superior engine, the F-14D will incorporate major improvements in its avionics and in its radar capability, ensuring its preeminence as maritime air superiority fighter of the 1990's.

Our inventory of F-14's is 428, with 54 more on order. We are requesting 18 aircraft in fiscal year 1986, with unit fly-away costs of $34.3 million.

PHOENIX AIM-54C





- **LONG RANGE FLEET AIR DEFENSE AAW MISSILE**
- **F-14 AIRCRAFT**

Our Phoenix inventory includes 65 AIM-54C's. Another 720 are on order. Quality assurance problems of the manufacturer have now been corrected and we have begun re-accepting deliveries of the Phoenix. Because this missile is so capable, so vital to our maritime air superiority, we have initiated steps to develop a second source of this weapon, and we should have a second manufacturer qualified by fiscal year 1987.

The unit fly-away cost of the Phoenix is $920,000.

Chairman GOLDWATER. That was $920,000?

Admiral MARTIN. $920,000 is the unit fly away cost for the Phoenix AIM 54C.

Chairman GOLDWATER. Thank you.

Admiral MARTIN. I have discussed the F/A-18 already. It is obvious that the Navy and Marine Corps are exceptionally pleased with this airplane. General Smith will also discuss the F/A-18 with you, as the Marines have had considerable operational experience with the Hornet. The Navy has just deployed, our first two Navy Hornet squadrons to the Western Pacific aboard the *Constellation.*

Mr. Chairman and members of the committee, unequivocally the F/A-18 has enjoyed the safest, most trouble-free fleet introduction of any aircraft in recent Navy-Marine Corps history. We are extremely pleased with the entire program.

In the last few days, I received a message from the commander of Carrier Group One, who is the embarked commander on board the U.S.S. *Constellation.* I would like to quote excerpts from this message if I may.

Chairman GOLDWATER. Say that again. What is the content?

Admiral MARTIN. The commander of Carrier Group One sent a message up the chain of command commenting upon the F/A-18 and the quality of the introduction of this aircraft into the fleet, and particularly in the squadrons that are now deploying and en route to the Western Pacific.

A few excerpts are: "Hornet's integration into the fleet has been exceptional. Significant accomplishments during the operational readiness evaluation included: a demonstrated 500 nautical mile long-range strike capability; first F/A-18 night supersonic AIM-7F shot at a supersonic drone; radar system availability was 100 percent for both squadrons."

"Overall, the F/A-18 availability averaged 97.2 percent mission capable."

Furthermore, the carrier group commander goes on to say in his message: "Despite growing pains, fleet introduction of the F/A-18 has been extremely successful, unquestionably the smoothest entry of a carrier-based aircraft into the fleet in recent history. The F/A-18 is a force multiplier that adds significant flexibility and punch to the battle group. The full potential for the Hornet has yet to be demonstrated, but what we have seen to date has been impressive."

Presently, there are 154 F/A-18's in our inventory, with 260 more on order. Our fiscal year 1986 request is for 84 aircraft, at a unit fly away cost of $21.2 million.

Senator BINGAMAN. Mr. Chairman, could I just ask a clarifying question, and maybe you went over this. But in the sheet that you have handed out, you have below minimum economic rate, at minimum economic rate, and above the minimum economic rate.

Could you define what you mean by that?

Admiral BUSEY. Senator, I am not sure what the data sheet that you have is.

Senator BINGAMAN. This was prepared by our staff. Let me ask you, at 84 of these F/A-18's, in your view is that an economic rate at which to buy these? I mean, what is your position on that? At which point should we think of shutting down the line and shifting to greater production of other units?

Admiral MARTIN. Let me start that off and then ask Admiral Busey to amplify. That figure was derived in an attempt to achieve a balanced program across the entire spectrum of our procurement. We always could use, and actually need, more airplanes than that.

But in terms of costs and balance vis-a-vis other programs, that figure of 84 was derived, and it is the one that we are requesting for this budget year, sir.

Senator BINGAMAN. Now, there are certain of these items that you have already gone over, the A-6E and others, where you are requesting very few. At what point do you think the number is sufficiently small that you would recommend we shut down the line?

Admiral MARTIN. We need those airplanes, Senator. I can not say at what point we should shut down the lines and no longer procure something that has a very real requirement in the future. The numbers that we have submitted are the numbers that we think are affordable and that will help us achieve our end strength goals.

Obviously, if you were only producing one aircraft to keep a line open, that would be highly inefficient. So we are trying to achieve a proper balance in this regard.

Senator BINGAMAN. What is the cost per unit for the A-6E's?

Admiral BUSEY. $21.7 million is the figure I have from the backup book, Senator. We have been procuring the A-6E's at the rate of six per year.

We have procured them at a higher rate in past years. However, under today's economic situation the best mix, as Admiral Martin has said, from a balanced naval aircraft force composition standpoint, leads us to the procurement rate of six per year.

That is not, from our view in NavAir, an uneconomical production rate. However, if we were to decrease the production rate of the A-6's below six per year, the unit cost of course on an aircraft basis is going to go up significantly. For example, Secretary Lehman, has previously testified, I believe, that our request this year is for 18 F-14 aircraft, also produced at Grumman Aircraft, whereas our previous production rate had been at 24.

That reduction is brought about in order to balance the force structure and to balance the aviation program, and has increased the cost of the F-14 by about $3 million per aircraft.

Senator Bingaman. Mr. Chairman, maybe you have already covered this, but I know one of your concerns in the 2 years I have been here on the committee is the number of production lines of naval aircraft. Has that problem been addressed, or have you testified yet as to whether you are doing anything to reduce that, or whether the number of lines stays the same or goes up?

Admiral Martin. Senator, we are making every effort we can to reduce the number of production lines. If my figures are correct, I think we have a total of 16 production lines this year. In fiscal year 1986, production lines will go down to 15, and to 14 in fiscal year 1987, 11 in 1988, 12 and 1989. This considers new aircraft procurement lines coming in and going out.

Some aircraft share production lines with others and therefore, they are not counted as separate lines. I might add a concerted effort is being made to reduce production lines.

Senator Bingaman. I will not interrupt any longer, Mr. Chairman. Thank you.

Chairman Goldwater. You did bring up a good point. It has been a point on which the Navy has been vulnerable for a long time. The number of production lines I take it now is running around 16, and it is something I do not think we should just treat lightly.

I think we should be constantly working to get the number of lines down, and maybe acquire more aircraft of fewer lines. I think that is better myself.

Senator Bingaman. You say you are going to add 15 lines in the 1986 budget. Which one is being dropped?

Admiral Martin. Please correct my previous figure. There will be 16 production lines in fiscal year 1986.

Senator Bingaman. And then 15 in 1987?

Admiral Martin. The next production line will be the SH-2 that will go out, the SH-2 helicopter.

Senator Bingaman. But you go from 16 to 14. Then you are dropping two, is that right? I am not that good at math, but I think I am that good.

Admiral Martin. May I submit the answer to that for the record, sir, in order that we can be positive?

Senator Bingaman. You also indicated in 1988 you will be going to 11 production lines. I would be interested in knowing which five will be dropped.

Admiral Martin. I will submit the answer to that for the record, sir.

[The information follows:]

Production Lines

There are 16 Navy production lines open in fiscal year 1985. The number of production lines, and line closings/openings, planned through the January 1985 Five Year Defense Plan are:

	Fiscal year—				
	1986	1987	1988	1989	1990
Procurement lines	16	14	11	12	11
Closings	KC-130T	AH-1T	UC-12B		E-6A

	Fiscal year—				
	1986	1987	1988	1989	1990
	TH-57	SH-2F	C-2A		
		F-16	T-34C		
			T-44A		
Openings	T-34C	T-44A	T-45	V-22A	
	E-6A				

Senator **Bingaman**. Thank you.

Chairman **Goldwater**. Senator Thurmond has a question.

Senator **Thurmond**. Admiral Martin, which is a higher priority for the Navy, the A-6E or the F/A-18?

Admiral **Martin**. Senator Thurmond, I do not think one can prioritize one or the other. Both of those aircraft are required, and they have separate and very distinct missions which are entirely different. Both of those are needed.

Senator **Thurmond**. What do you consider the more capable?

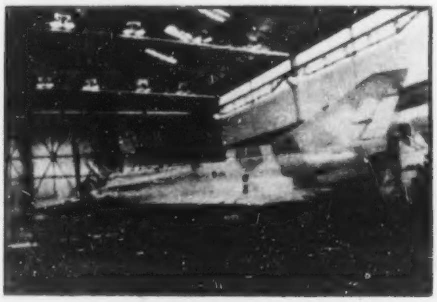
Admiral **Martin**. Well, sir, since their missions are different, you cannot equate one to the other in terms of capabilities. One is an all-weather attack aircraft, the other is a strike fighter which provides both a fighter capability and an attack capability. The F/A-18 was designed to replace the A-7.

Senator **Thurmond**. The F/A-18 could not answer the purpose?

Admiral **Martin**. Presently, the F/A-18 does not have an all-weather deep interdiction strike capability.

Senator **Thurmond**. Thank you.

ADVERSARY AIRCRAFT



KFIR

- INTERIM SOLUTION
- 12 AIRCRAFT
- 4-YEAR NO COST LEASE
- DELIVERIES BEGIN MARCH 1985

F-16

- COMPETITION COMPLETED DECEMBER 1984
- DELIVERIES BEGIN APRIL 1987

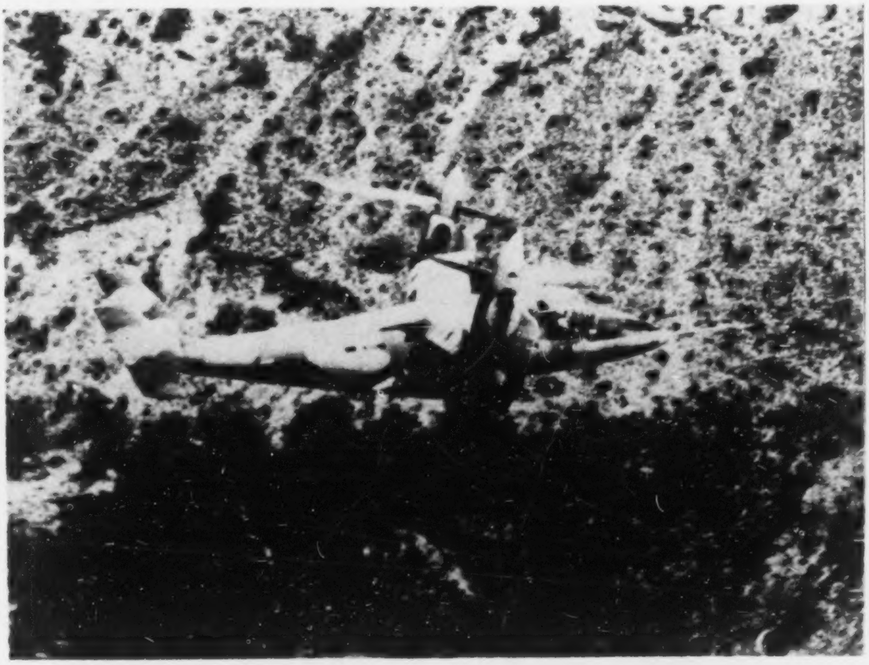
Admiral **Martin**. Recently we selected the F-16 as our adversary aircraft, 14 of which have already been approved by Congress. The Navy's version of the F-16 will be a training-only version. It will not incorporate the more advanced radar and ECM systems of the newer Air Force version, nor will it have an internal gun.

The Navy F-16 will eventually be employed on both coasts to provide realistic air combat training to Navy and Marine air crews. Our fiscal year 1986 request includes 12 F-16's, at a unit fly-away cost of $9.5 million.

In the interim, to provide us with an early capability to fulfill our urgent supersonic air combat training requirement, we have entered into a no-cost lease agreement with the Israelis for 12 Kfir C-1 aircraft. Funding for operations and maintenance will be provided by the Navy.

The last two aircraft I will discuss are both in the research and development phase: The very exciting JVX, now officially named the V-22A Osprey; and the T-45TS training system, formerly known as the VTX-TS.

V-22A OSPREY

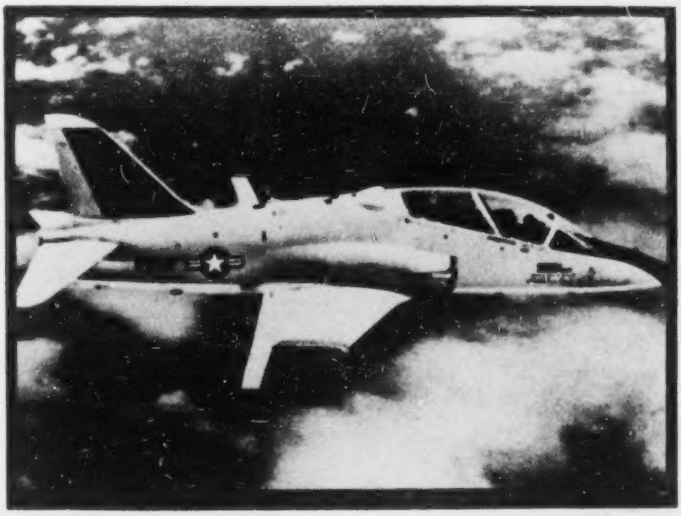


- Multi-Service/Multi-role
- Marine Corps., Navy, Air Force, Army
- USMC - Assault transport
- USN - Multi-mission: Combat Rescue, Special Warfare, Logistics
- USAF - Special Operations
- USA - Assault Lift/Support, MEDEVAC

The V-22A is now successfully completing a 23-month design effort and will be ready for a full-scale development decision in May of this year. The Osprey employs advanced but proved technology to provide us with a highly capable vertical lift tilt-rotor aircraft which will fulfill a variety of missions for all of the services.

We have flown the prototype, the Bell XV-15, and are profoundly impressed. Our fiscal year 1986 request for $603.7 million will continue the progress of this remarkable aircraft toward Marine Corps introduction in 1991.

T-45



- **Undergraduate jet pilot trainer system**
- **Replace T-2C and TA-4J**
- **System Elements**
  - **T-45 Aircraft**
  - **Academics**
  - **Simulators**
  - **Contractor Logistic Support**

The T-45TS is an entire training system. It is designed to train the tactical aviators of tomorrow. A major component of this entire system, obviously, is the T-45 aircraft itself. But the system concept is what makes this program so promising. It is a carefully integrated system of aircraft, simulators, and academics, using the most modern in and out of cockpit training techniques to enable us to train a fledgling student to become a proficient tactical carrier aviator.

This program is structured toward an initial operating capability in 1990, to simultaneously advance our training quality while preventing any inventory shortfalls of training aircraft. Our fiscal year 1986 request is for $114.2 million to continue development of this urgently required training system.

Mr. Chairman and members of this committee, I am genuinely pleased with the strides that have been made during the past 4 years in naval aviation, thanks largely to the support of this body. I am convinced that the best insurance that we have toward deterring aggression and adventurism in this era of violent peace is to maintain a strong, ready, and capable defense posture.

Naval aviation is a key and often employed ingredient in this posture, and with your continued support we will maintain and improve upon our capabilities.

Thank you, Mr. Chairman and members. I will now turn the floor over to General Smith.

[The prepared statement of Admiral Martin follows:]

PREPARED STATEMENT OF VICE ADM. EDWARD H. MARTIN, DEPUTY CHIEF OF NAVAL OPERATIONS (AIR WARFARE)

Mr. Chairman and distinguished members of the committee: it is a privilege to appear before you today to present and discuss the Navy's fiscal year 1986 request for aircraft procurement and to discuss some of those weapons which comprise naval aviation's arsenal.

As you know, the procurement of today's highly sophisticated weapons systems—the aircraft, the missiles, the other ordnance, the spare parts, the support equipment—is a very expensive proposition. At every step of the budget formulation process through which we arrive at the request now before you, constant attention is paid to keeping costs down and capability up, to getting the best possible defense—one which works—at an affordable cost. The aircraft procurement, Navy (APN) budget request for fiscal year 1986 represents just over 5 percent real growth over the funds appropriated in the fiscal year 1985 continuing resolution adopted last year by the Congress. The real growth in APN from fiscal year 1984 to fiscal year 1985 was less than 2 percent.

That real growth must be distributed to all four pillars of force effectiveness: readiness, sustainability, modernization and force levels.

Over the last four years we have made substantial progress in reversing the adverse trends created in all four of those pillars by the neglect of the 1970's.

The new aircraft and systems we have procured, and the support we are providing them, have revitalized our carrier air wings, our patrol wings, our Marine air wings and our support forces.

READINESS

The readiness indicators of our forces have continued to rise, despite the fact that the Navy's operational commitments have been increasing. For example, our carrier forces operate at a tempo almost 15 percent greater than at the peak of the Vietnam war. Carrier presence is mandated by the national command authority in a variety of places throughout the world today—the Mediterranean, the North Arabian sea, the Western Pacific.

That "Op tempo" is expensive, and takes its toll on man and machine. Nonetheless, our fiscal investments over the past few years have enabled us to improve our preparedness for conflict while maintaining that pace.

An important measure of our aviation readiness is the aircraft mission capable (MC) rate, defined as that percentage of the 24 hour day an aircraft is capable of launching to perform one or more of its assigned missions. Our fleet-wide aircraft MC rate has risen impressively, from roughly 57 percent in 1981 to just under our goal of 70 percent in fiscal year 1984. I fully expect to beat that goal in fiscal year 1985, and in fiscal year 1986 we will raise the goal to 73 percent—and we intend to meet that goal by fiscal year 1988.

Many things have contributed to that dramatic improvement in our readiness. We have been delivering to the fleet some newer, more capable, more reliable aircraft. For example, the F/A-18 requires less than half the maintenance man hours to keep it flying than the F-4 and A-7 which it is replacing. Moreover, it flies more than three times the flight hours of those aircraft before corrective maintenance is required. That is a tribute to the technological sophistication of American industry, and illustrates another important point.

AIRCRAFT AGE

The age of the Navy's aircraft inventory is a major factor in its readiness. Older aircraft are less reliable and more expensive to maintain and operate. Furthermore, modernization of existing aircraft to meet ever more sophisticated threats is an expensive but often necessary proposition.

To be effective, our aircraft, like our people, must be young and vital. But we are losing ground in that regard.

In fiscal year 1973, at the end of our participation in the Vietnam war, the average age of our aircraft inventory was 8.3 years. We procured 297 aircraft, but the average age increased to 9.5 by the time those aircraft were delivered in fiscal year 1975, and to 9.8 in fiscal year 1976. As the number of aircraft procured decreased, to a low of only 125 airplanes in fiscal year 1980, the average age continued to increase. By then the average age was 11.4 years. In 1983, when the full effects of 1978, 1979, and 1980 procurement policies were evident, it was 12.4. Since then we have slowed the aging process, but have yet to turn this adverse effect around. Today, the average age of our aircraft inventory is 12.6 years. Two thirds of our aircraft are over 10 years old and more than fifty percent are over fifteen.

With the 322 aircraft procurement program we have outlined in the fiscal year 1986 budget request, I hope to be able to return next year and tell you that the force is younger then than it was today and that the trend will continue. To make that possible, your continued support for substantial real growth in aircraft procurement over the Five Year Defense Plan (FYDP) is vital.

PROCUREMENT

To accomplish both the qualitative and quantitative improvements to our force preparedness (i.e., modernization and force levels) we have pursued a number of procurement initiatives. We have had considerable success in bringing down the cost of aviation weapons systems by the application of sound business and contracting techniques and strategies.

Competition has become an integral part of the corporate approach to acquisition management. An intensive review is made of programs which have traditionally been "sole source." Our goal is to challenge and breakdown previous barriers to competition and make it easier to compete a program than to go sole source. We are positioning ourselves to sustain growth in competition in the long term. The CV inner zone HELO (SH-60F) and the P-3C update IV are recent programs using competition extensively. The carrier/aircraft inertial navigation system (CAINS II), the BQM-126A target, and the supersonic low altitude target (SLAT) are examples of competitive programs that sustain competition through development and several production lots. Also, in programs like the JVX tilt rotor aircraft program (now designated the V-22A) the Naval Air Systems Command is establishing the planning framework for long term sustainable production competition.

Emphasis has been placed on the development of dual sources. There are presently 25 major systems or subsystems that have a second source, or are in the planning stage for dual sourcing.

These efforts are paying impressive dividends. Competitively awarded contracts increased from $.8 billion in fiscal year 1983 to $1.66 billion in fiscal year 1984 and the percent of awards increased from 9.3 to 16.5 percent. In fiscal year 1985 we expect to let over $2 billion in competitive contracts and achieve a competition percentage greater than 20 percent.

Aggressive action to control the cost of aircraft weapons systems has also been set in motion. We are performing intensive reviews of subcontractor costs, which represent 40–60 percent of the total price of a major weapons system. In the past, the primary responsibility for managing the charges by subcontractors was assigned to the prime contractor. However, as it became apparent that the prime contractors were not placing the proper emphasis on this effort, we took a more aggressive role in the review and approval of subcontracts. Labor rates at both the prime and its subcontractors have been closely monitored and unrealistic increases have been disallowed. Overhead cost reviews of major prime contractors have been conducted to provide a better insight into the costs associated with overhead pools. The results of these efforts have been outstanding. Compared to fiscal year 1983 costs, the total aircraft flyaway costs for aircraft procured in fiscal year 1984 were 6 percent lower. Of the contracts awarded infiscal year 1984, virtually all were fixed price type contracts, precluding the possibility of cost overruns.

We will continue to seek more efficient ways to reduce the costs of weapons systems while ensuring that quality and performance are maintained at levels required to meet fleet readiness needs. Data available to date indicate that our performance in controlling aircraft weapons systems costs, and in increasing competition, will be even better in fiscal year 1985.

PRODUCTION LINES

The Navy is fully aware of, and shares, congressional concern over the number of production lines open to provide aircraft for naval aviation. Last year we told you that we would reduce the number of production lines from this year's 16, to 14 in fiscal year 1986, 12 in fiscal year 1987 and 11 in fiscal year 1989. We continue to work to that end. The start of procurement for the E-6A, and one additional year of SH-2F procurement, leave us with 16 lines in fiscal year 1986. The decision to continue procurement of the A-6E while development of the A-6F is underway means a one-year delay to 1990 before we reach the original goal of eleven production lines.

MODERNIZATION

To help balance the effects of the 12.6 year average age of the fleet, we place much importance on upgrading existing aircraft through the aircraft modification program, funded by APN budget activity 5. Many Navy aircraft now in the inventory will perform mission service through the year 2000 and beyond. This will require periodic configuration improvements to increase service life, solve in-service safety problems, and add weapons capabilities to keep ahead of the threat. Major initiatives this year in the modification program are designed to provide reliability, maintainability and capability upgrades to the A-6, F-14, F/A-18, H-2, H-3, P-3, S-3 and E-2 aircraft. Additional emphasis is directed toward support of common avionics improvements which will provide our aircraft with improved reliability in flight equipment. Common electronic countermeasures improvements will increase aircraft survivability in the hostile environment of modern warfare.

SPARES FUNDING

Among the prime elements of material readiness are aviation spares, aircraft depot rework and support equipment. This April we start the aviation portion of the Navy's test of stock funding by including aviation repairables. We expect the same excellent results that were achieved in the non-aviation repairables test. One of the first anticipated benefits will be an increased number of aviation components repaired, and a consequent increase in our "ready-for-issue" shelf stocks. This will provide an early boost to both readiness and sustainability. The parts will be there, in the fleet, whether needed for peacetime operations or wartime mobilization, resulting in significant improvement over our current situation.

NAVAL AIR RESERVE

Hand-in-hand with advances in the Regular aviation force are initiatives to upgrade the Naval Air Reserve. Both Reserve Air wings are receiving modern aircraft, Including the F-14, F/A-18, A-7E, and E-2C. The first E-2C squadron is already operational. Two fighter squadrons began accepting F-14's this year. Two Reserve attack squadrons transitioned to the A-7E last year with the remaining two A-7B squadrons programmed for transition in 1986. F/A-18 transition training for the Reserve Hornet Squadron, VFA-303, began last year. The squadron receives its own aircraft in fiscal year 1986 and will be ready to mobilize. In another important program, Reserve Squadron Augment Unit (SAU) crews began training with fleet readiness squadrons (FRS) last year. These Reserve SAU crews fly the same A-6, F-14 and S-3 aircraft as their gaining commands. We plan to expand the SAU program at FRS sites to increase our total force readiness. We also have a master augment unit (MAU) at Brunswick, Maine in which Reserve air crews fly the latest version of the P-3, the same aircraft they will fly if mobilized. We have plans to expand the MAU program to Moffett Field, California and to Jacksonville, Florida.

FLYING HOURS

I am particularly concerned with one area of naval aviation, our flying hour program. Flying hours are an essential element of both readiness and sustainability, providing for peacetime aircrew training as well as fulfilling real world operational commitments. While overall Navy flying hours have increased in recent years, so have our commitments.

Our annual flying hour program is constructed to balance the requirements of individual aircrew training and fleet operations. Training flying hours for tactical and ASW squadrons are based on requirements computed in terms of primary mission readiness (PMR), defined as "those hours required to maintain the average flight crew qualified and current to perform the primary mission of its aircraft, to include all weather/day/night carrier operations as appropriate." In large part, world events drive fleet operations. Unforseen increases in presence operations, and contingency responses to world events, disrupt the balance between training and operations. The problem is one of affordability. We do not have the fiscal resources to train at required levels and still support an increased operating tempo. In effect, fleet commanders must satisfy the increased flying requirements of deployed operations at the expense of individual shore-based training, whenever unforseen commitments arise. There are no simple solutions but fiscal constraints are a sine qua non to our decision making process.

Recognizing this, we work hard to develop our flying hour management plan, which is currently programmed to achieve a fleet wide 87 percent PMR rate for tactical and ASW squadrons in fiscal year 1986, a 4 percent increase over our fiscal year 1983 plan.

AIRCRAFT PROCUREMENT

The biggest share of our fiscal resources goes to the procurement of those aircraft and weapons which we need to keep naval aviation strong, young and vital. They incorporate technology which improves the overall lethality and survivability of our force. While those aircraft and weapons contribute most visibly to our force structure, they also directly improve our readiness, our sustainability, and the modernization of our forces. They provide us with the assets we need to accomplish our peacetime missions while simultaneously preparing for the combat we all hope to prevent.

The following paragraphs discuss those aircraft and key weapons we are requesting this year for naval aviation, and provide fiscal details of our fiscal year 1986 APN request.

A-6E INTRUDER

The A-6E is the Navy's only all-weather attack aircraft. It incorporates a solid state weapons release system, a single integrated track and search radar with a moving target indicating system, and an inertial navigation system. The A-6E also provides pathfinder/strike leader functions for strike groups. Powered by two J52-P-8B engines, the aircraft has a combat speed of 500 knots at 500 feet when configured with 28 five-hundred-pound bombs.

An added capability, target recognition attack multisensor (TRAM), has been procured since 1976. This major subsystem, procured under a multiyear production contract, includes an infrared sensor, a laser ranger/designator and a laser receiver. TRAM gives the intruder the capability to deliver laser guided weapons and markedly improves its night surveillance and identification capability.

As you are aware, we recently discovered wing fatigue cracking in some of our A-6E and KA-6D aircraft. The cracks were discovered during inspection of wings with high flight time, and confirmed the results of an ongoing fatigue study. We determined that the current service life assessment of A-6 wings is significantly less than had been predicted based on fleet usage during the 1970's.

When the A-6 was originally procured in 1959, there were no fatigue requirements specified in the contract. However, there was a design goal of 2,500 hours. Full scale fatigue tests in the 1964 time frame demonstrated a fatigue life of 2,250 hours. During the early 1970's, this fatigue life was extended to 4,400 hours on the basis of actual fleet data.

In the early 1980's, a reassessment of the original test and of fleet data began as a result of extended utilization of the A-6's. This reassessment took into account more recent analytic techniques and the impact of increased weights and maneuvering loads. The net effect of this reassessment was a return to the original 2,250 hour limit. This analytic work has subsequently been confirmed by in-depth teardowns of several high time wings. As a precautionary measure, the Navy has grounded the 76 highest fatigue usage aircraft and restricted the operating envelope of another 113 aircraft to 3's or less.

To remedy this situation, the Navy has embarked on an accelerated "new" wing program. In the past, wings have been procured as a part of the total airframe. We now plan to conduct a competition for the A-6 wing to be supplied as Government-furnished equipment. This intent was announced in the Commerce Business Daily on January 22, 1985. The contract requirements will include a 4,400-hour service life on the wing as opposed to the current 2,200-hour service life, and will include a form, fit and function replaceable wing for the A-6E aircraft and compatible with the A-6F at no increase in weight.

In order to maintain current fleet readiness, wings now under contract as part of the airframe contract will be delivered to the present configuration and schedule. Our objective is to have the new wing available for incorporation into the new production A-6E's and for retrofit into existing A-6E's commencing in fiscal year 1988.

The A-6E inventory as of 1 January 1985 is 353 with 18 aircraft funded and undelivered. The procurement cost through the budget year is $2,976.4 million. The fiscal year 1986 request includes $224.0 million for the production of six aircraft, and advance procurement for 6 aircraft in fiscal year 1987. The recurring flyaway cost of the A-6E is $21.7 million.

A significantly improved model of the intruder, the A-6F, is now under development with a fixed price research and development contract. Procurement will begin in fiscal year 1988. The A-6F represents a major advancement in all-weather-attack technology. It will incorporate a new engine and digital avionics which will further improve reliability, maintainability and performance. Survivability will be enhanced through incorporation of the latest advances in fire and explosion suppression and improved standoff targeting. High resolution radar and an air-to-air capability provide major improvements in weapons system performance.

EA-6B PROWLER

The EA-6B is a four-place, twin engine derivative of the A-6 attack aircraft. The aircraft is a fully integrated electronic warfare weapon system that combines long-range, all-weather capability with advanced electronic countermeasures and electronic support measures systems. It can carry up to five jammer pods which house the high power jamming transmitters capable of operating against various threat emitters. The EA-6B, with an inflight refueling capability, is designed for carrier and/or advanced base operations.

The primary mission of the EA-6B is to support strike aircraft and ground troops and provide a counter-targeting capability for battle groups by suppressing and degrading an enemy's electronic systems through tactical jamming. Secondary missions include passive early warning for fleet defense and obtaining tactical electronic intelligence within a combat area. The EA-6B is the only carrier based aircraft which provides these capabilities.

The EA-6B inventory as of 1 January 1985 is 76, with 18 aircraft funded and undelivered. The procurement cost through the budget year is $4,072.7 million. The fiscal year 1986 request includes $501.6 million for the production of 12 aircraft and advance procurement for 12 aircraft in fiscal year 1987. The recurring flyaway cost of the EA-6B is $23.5 million.

AV-8B HARRIER

The AV-8B, an improved vectored thrust V/STOL aircraft, based on the AV-8A concept and utilizing the Pegasus II engine, has up to twice the range or payload of the older Harrier. It combines aerodynamic improvements with an angle rate bombing system for increased weapons delivery accuracy and it has a new stability augmentation system to reduce pilot workload. The result is a much more capable and reliable aircraft. The AV-8B will meet the Marine Corps requirement for a light attack aircraft to provide responsive offensive air power that can operate from austere forward sites in direct support of ground forces.

The AV-8B inventory as of 1 January 1985 is 20 with 77 funded and undelivered. The procurement cost through the budget year is $4,461.9 million. The fiscal year 1986 request includes $1,076.7 million for the production of 46 aircraft and advance procurement for 47 aircraft in fiscal year 1987. The recurring flyaway cost of the AV-8B is $16.6 million.

F-14A TOMCAT AND AIM-54C PHOENIX

The F-14A is a high performance, maritime air superiority fighter. It is a two-place, variable sweep wing, supersonic, carrier-based airborne weapons system. The F-14 has visual attack and all-weather capability to deliver Phoenix and Sparrow missiles using the AWG-9 weapons control system. It also employs sidewinder missiles and the M-61 gun for close-in air-to-air combat. The F-14 is powered by twin TF30-P-414A engines. Beginning with the last aircraft in fiscal year 1986, the F-14A will be procured with a new engine, the General Electric F-110, which will provide major improvements in both safety and performance. A major upgrade of the F-14 aircraft is planned for production incorporation in fiscal year 1988. The upgrade enhances operational capability with improvements in electronic counter-counter measures in the radar, a digital avionics suite, and improved engine performance and reliability.

The F-14A inventory as of 1 January 1985 is 428 with 54 aircraft funded and undelivered. The procurement cost through the budget year is $13,137.8 million. The fiscal year 1986 request includes $812.4 million for the production of 18 aircraft and advance procurement for 18 aircraft in fiscal year 1987. The recurring flyaway cost of the F-14A is $34.3 million.

Phoenix is a supersonic, all-weather, air-to-air missile with semi-active mid-course guidance, active terminal guidance, and long range stand-off capability. The AIM-54C is the improved version of the AIM-54A and is in the sixth production run of the series. Six Phoenix missiles can be carried aboard the F-14 aircraft. The AIM-54 is designed to counter enemy aircraft and missiles, and is capable of near simultaneous launch against six targets in an all-weather, heavy jamming environment.

Because of its crucial contribution to fleet air defense and our low inventory posture, the Navy is planning to initiate competitive dual source procurement of Phoenix by 1989.

The AIM-54C inventory as of 1 January 1985 is 66 with 723 missiles funded and undelivered. The procurement cost through the budget year is $1,706.8 million. The fiscal year 1986 request includes $393.5 million for the production of 265 missiles and advance procurement for 420 missiles in fiscal year 1987. The recurring flyaway cost of the AIM-54C is $0.92 million.

F/A-18 HORNET

The F/A-18 naval strike fighter is a twin-engine, mid-wing, multi-mission, tactical aircraft. The F/A-18 is employed in both Navy and Marine Corps squadrons. Fully combat-capable, dual-cockpit aircraft are used in the Marine tactical air control (airborne) mission and as training squadron aircraft. The F/A-18 can be configured to accomplish specific fighter or attack missions through the selected use of external equipment. This capability provides the operational commander more flexibility in employing his tactical aircraft in a dynamic scenario.

The F/A-18 is this Nation's first strike-fighter, designed for such traditional strike (attack) applications as interdiction and close air support without compromising fighter (escort and fleet air defense) capabilities. The result is a strike aircraft with the same airframe, engine, and flight control systems used for a fighter aircraft. Excellent fighter and self-defense capabilities will ensure strike mission survivability.

Development of an austere all-weather attack capability for both single and dual-cockpit aircraft begins this year in conjunction with the addition of a navigational flir and night-vision goggles. This will allow the F/A-18 pilot to visually navigate to, and attack, targets at night with virtually the same accuracy as in daylight.

Nine Navy and Marine Corps Hornet squadrons are operating today from eight air stations and two aircraft carriers. Total flight hours exceed 100,000.

Last summer F/A-18 deliveries from the manufacturer were temporarily stopped when we discovered that some of the aircraft were exhibiting fatigue damage in their vertical tail support frames. The cracking was attributed to the impingement on the twin tails of a Vortex from the wing's leading edge extension along the empennage with much greater force than originally predicted. A repair kit was designed, installed and successfully tested. The manufacturer has agreed to replace all cracked or broken frames and install the repair kits at no cost to the Navy. Deliveries re-commenced in late November, and will be back on schedule this April.

The repairs to date, and the incorporation of strengthened tail supports in future production aircraft, ensure that the F/A-18 will achieve full design fatigue life.

One year after initial operational capability of our first navy strike-fighter squadron, the USS Constellation is deployed to the Western Pacific with two Hornet squadrons aboard. During work-ups prior to this initial deployment, the F/A-18 demonstrated the very high mission reliability and effectiveness predicted for the Hornet. Our second aircraft carrier, with four strike-fighter squadrons embarked, is now preparing for deployment.

The F/A-18 inventory as of 1 January 1985 is 147 with an additional 260 aircraft funded and undelivered. The procurement cost through the budget year is $16,911.3 million. The fiscal year 1986 request includes $2,849.6 million for the production of 84 aircraft and advance procurement for 102 aircraft in fiscal year 1987. The recurring flyaway cost of the F/A-18 is $21.2 million.

E-2C HAWKEYE

The E-2C is an all-weather, carrier-based, airborne early warning (AEW) aircraft. It carries a crew of five: pilot, co-pilot, combat information center officer, air control officer and flight technician. The E-2C has a high wing, a 24 foot rotodome, mounted above the fuselage and will be powered (by the end of fiscal year 1986 production) with two T56-A-427 turbo-prop engines.

The E-2C extends task force defense perimeters by providing early warning of approaching enemy units and by vectoring interceptors into attack position. In addition to this function, the Hawkeye also provides strike control, air traffic control, radar surveillance, search and rescue assistance, communications relay, and automatic tactical data exchange.

Fiscal year 1986 begins the major update of the E-2C's electronics suite. This update will ensure the E-2C's AEW advantage against the threat through the 1990's. The increase in aircraft weight due to these improvements and other structural modifications has brought about the urgent requirement for the upgraded T56-A-427 engine.

The E-2C inventory as of 1 January 1985 is 78 with 13 aircraft funded and undelivered. The procurement cost through the budget year is $3,576.5 million. The fiscal year 1986 request includes $390.3 million for the production of 6 aircraft and advance procurement for 6 aircraft in fiscal year 1987. The recurring flyaway cost of the E-2C is $35.3 million.

AH-1T SEA COBRA

The AH-1T is a two place (pilot and gunner/copilot) attack helicopter designed and built to provide the high speed and maneuverability required for the attack mission. Maximum take-off weight is 14,000 pounds. The armament on the AH-1T includes the sidewinder and TOW missile systems, a chin-mounted 20 MM turret gun, and a wide variety of forward firing and droppable external stores. The Hellfire missile system will be incorporated beginning in fiscal year 1986.

The AH-1T is a helicopter gunship whose mission is enroute escort and protection of troop assault helicopters, landing zone preparation immediately prior to the arrival of assault helicopters, landing zone fire suppression during the assault phase, and fire support during ground escort operations. With the incorporation of the TOW and Hellfire missile systems, the AH-1T has been assigned the additional mission of enemy armor destruction, which requires operation both at sea level and in a high/hot environment.

The AH-1T inventory as of 1 January 1985 is 46 with 22 aircraft funded and undelivered. The procurement cost through the budget year is $730.6 million. The 1986 request includes $218.5 million for the production of 22 aircraft. The recurring flyaway cost of the AH-1T is $6.9 million.

V-22A OSPREY

The V-22A Osprey (originally the JVX) program is successfully completing a 23 month preliminary design effort. This program will be ready for a full scale development go-ahead decision in May 1985. The joint nature of the program remains solidly intact with active participation in the development phase by the Navy, Marine Corps and Air Force, with the Army joining in the procurement phase for a total program acquisition of 913 aircraft. The V-22A will be a vertical-lift tilt-rotor aircraft using advanced, but mature, technology to provide the U.S. military services with a self-deployable (2100NM range without refueling), multimission capability for the 1990's and beyond. The V-22A weapons system will be capable of satisfying varied operational requirements: Marine Corps vertical assault lift, Navy combat search and rescue, Air Force special operations, and Army cargo/utility operations.

No procurement funds are requested for the V-22A in fiscal year 1986. RDT&E funds are requested in the amount of $603.7 million.

T45TS (VTXTS)

An important ingredient in the modernization of our tactical forces is the modernization of the aircraft with which we train the tactical aviators of the future. The T45TS, the entire training system, meets that critical need. The integrated system of aircraft, simulators and academics is being built around the following requirements: An early initial operating capability to reduce the impact of shortfalls in training aircraft inventories; the advantage of derivative technology which enables a firm fixed price R&D effort; a procurement schedule which is executable; and an APN funding profile which is affordable. The full scale engineering development phase has been initiated under a firm fixed price contract.

No procurement funds are requested for the T45TS in fiscal year 1986. RDT&E funds are requested in the amount of $114.2 million.

F-16 ADVERSARY

The Navy has a requirement for forty-eight supersonic adversary aircraft to provide realistic air combat training to Navy and Marine tactical air crews. Congress appropriated funds in fiscal year 1984 to procure 4 adversary aircraft, and in fiscal year 1985 to procure 10 more. The competitive selection of the F-16 was announced in January. The Navy adversary version of the F-16 will be procured strictly as an air combat training aircraft. It will utilize the radar and electronic warfare suite of the F-16A, and will not have a gun system.

The fiscal year 1986 request for F-16 aircraft includes $130.5 million for the procurement of 12 aircraft. The recurring flyaway cost of the Navy version of the F-16 is $9.5 million.

AGM-88A HARM

HARM, an air-to-surface anti-radiation missile (ARM) is the successor to the shrike and standard arm and will ultimately replace both in the Navy inventory. HARM characteristics include software flexibility, inflight retargeting, high speed, large launch envelope, wide band coverage in a single head, high sensitivity, and compatibility with various Navy and Air Force tactical aircraft.

The missile is designed to destroy or effectively supress land and sea based radars which direct air defense artillery and surface-to-air missiles. The Navy plans harm deployment with A-7E, A-6E, EA-6B, and F/A-18 aircraft. Initial operational capability was achieved in November 1983 and HARM was completed the second year of procurement on schedule.

A major effort, under the management control of Naval Weapons Center, China Lake, California, is underway to develop a low cost seeker (LCS) for the HARM.

The AGM-88A inventory as of 1 January 1985, is 191 with 1,247 missiles funded and undelivered. The procurement cost through the budget year is $1,064.5 million. The fiscal year 1986 request includes $266.7 million for the production of 904 missiles. The recurring flyaway cost of the AGM-88A is $.261 million.

Chairman GOLDWATER. Thank you, Admiral, and we will get to General Smith in just a moment.

CUT $18 BILLION

This is not an easy question for me to ask you and the answer is not going to be an easy one for you to come up with, as you are the first to testify and therefore the first to be asked this question. But the other night about midnight, I received a call and was told that the Budget Committee had decided that the Armed Services Committee has to cut the budget for defense by $18 billion.

Now, I do not think that is the last of it, but this is what we are faced with. I need not remind you that we only have one new item in the budget this year, and that is a communications system between the Army and the Navy at $40 million.

So what the Budget Committee is asking us to do is to not pay bills that we owe. Now, I am going to ask you this question and I want an answer, but not today. But I want you to give it some very serious thought, because I am very serious in asking this question.

And I never thought I would see the day when this question had to be asked.

If the committee decides that we will have to cut a number of programs, and to get to $18 billion there is no question but we will have to, which aircraft system can you best live without? The F-14, the F-18, the A-6E, the EA-6B, the E-2C, or the C-2?

And for the Marines, the same question: Which system can you best live without, the F-15, the AV-8, or the JVX?

Now, I am very serious in asking this and I want an answer, because I have to tell you the truth, that we are not going to get $18 billion out of the Defense budget by nitty-gritty little picking here and picking there. I am talking about massive closures of programs, possibly including programs like the M-1, main battle tank, which I know the Marines are now interested in.

The full committee is hearing this for the first time. So some time within the next week I would like an answer from you. If the committee has to chop something, where do you want us to chop? Do you understand it?

Admiral MARTIN. Yes, sir, indeed I do. And we will provide a response for the record.

[The information follows:]

AIRCRAFT PROCUREMENT

The Navy's fiscal year 1986 request is a carefully balanced program which specifically addresses affordability without compromising defense requirements, which are determined by the threat. Each of the aircraft you have identified satisfies a specific requirement vis-a-vis known or postulated threats. None, therefore, could be categorically eliminated from our procurement plans.

Admiral MARTIN. I would like to say, sir, that our program is designed with the future in mind, in a very balanced and hopefully affordable manner. And I would hope sincerely that we do not repeat the sad lessons of the seventies and create a position from which we cannot extract ourselves in the future.

Senator GOLDWATER. I am in complete agreement with you. The trouble is, the Budget Committee does not understand the problems of defense. I do not know what we are going to do to try to make them more understanding. But we are not only—under the figures of the Budget Committee has given me—not only going to proceed into the disastrous areas of the seventies and even part of the eighties, we are going to go past that, because, as you know and members of this committee know, our tactical air forces have never kept up with our plans.

We have not increased our tactical air capability in over 25 years. So this decision that we may have to make—and I would say the chances are excellent that it will be made—it will be a decision that personally I would hate to live with. But when they are talking $18 billion, they are not talking hay.

So regardless of what you think you want for the long run and what we want for the long run, we have received the message from up above: Cut $18 billion. And I think it is going to be more than that before they get through.

I have merely asked you a question and I will await your answer.

Senator NUNN. Mr. Chairman, could I identify myself with your remarks, both in spirit and in terms of the question. I think tough questions have to be asked, and I also regret it. I think it is going to be a very serious situation, but I believe unless we start asking the kinds of questions the chairman just asked we are not going to be able to make the cuts that we are going to be faced with in any kind of logical way that basically protects the maximum amount of the defense capability we can.

And it is a hard question to ask, and it is a more difficult question to answer, I am sure. But I join the chairman in that request and in the general spirit of his remarks.

Senator THURMOND. Mr. Chairman, in figures provided by the staff it indicates that about $12 billion of that cut is in outlays, and I am just wondering if the Chair has any advice to the subcommittees at this time concerning these questions.

Chairman GOLDWATER. Well, the situation that we face is that we have nothing but bills to pay. They do not have what other Departments would call a budget. We never really have. What we do is to buy a number of items, some for delivery now, some for delivery 4, 5, some even longer than that, years ahead.

So we owe a number of manufacturers around this country a lot of money, and that is where it has got to come from. It is not going to come from budget. It will come from what we owe.

And I think this should be fair warning to a lot of our big manufacturers that they may not get paid. I have to be perfectly honest in this. I have worked with this budget for the last 4 or 5 months, and we are getting noplace. Any influence you have on them, it could sure be used.

Now, General Smith, did you have a statement you wanted to make?

Senator DENTON. Mr. Chairman; could I make an additional remark?

Chairman GOLDWATER. Yes, sir.

Senator DENTON. I agree with you, sir, about the tragedy of the cut, and I think it is correct. As you indicate if we have to make certain kinds of cuts ourselves or go, say, with the Rudman proposal, they should be cuts which the DOD and the services recommend be the kind that are taken out, so that we do the least harm.

But this Senator—and I am sure you too, Mr. Chairman and Senator Thurmond and others in this room—will probably find it their duty to emphasize to the Budget Committee and others who are recommending such tremendous cuts the effect of those cuts, to help them realize what those effects are. I am afraid that we have gotten ourselves into a bind because of the way the issue has been presented to us by the media, by well-meaning businessmen and others out in the communities, who say there has got to be a lot of fat in the defense budget, let us cut it and we can get rid of this big budget deficit, and so on.

The examples I have seen so far on the farm bill, instead of showing that we are going to do any cutting there, the Budget Committee is trying to increase the amount of money involved. And yesterday on TVA, sir, which is of interest to my State—I would like to give an example to you so your well-known justified indignation can be raised—I was at a farm meeting yesterday and, having been told that TVA money was going to be cut something like 70 percent so that the private sector could take over that 70 percent—it is going to be cut in 1 year, I was asked by constituents to represent the idea that that should be phased out, that TVA had already agreed with OMB to phase down in 5 years to such and such a percentage taken over by the private sector.

I made some inputs that were rather modest about that, and then the good news was brought by the Farm Bureau man from my State saying that the TVA budget had been frozen. I said, do you mean that the money that was not going to be taken out for private sector, money that the TVA had already agreed to, is being reinstalled and we are now going to go ahead as if the TVA had not agreed to be privatized incrementally? And he said, yes, that is what I mean.

So I do not have a great deal of optimism about cuts being made in other sectors. While we have gone—and I have to repeat this—from an era in Kennedy's time when we were spending twice as much on defense as on social programs, we are now spending the reverse. I believe that you are going to agree that we should make the effort, perhaps as a result of some meetings we will have, to bring to the consciousnesses of our colleagues the effects on our national security, on the ability to protect our interests, of what they are proposing.

I do not have the slightest belief that they know anything about the effect of those things yet. When you said we were going to stick with 4 percent as a floor, I took that as a firm intent. And you know, sir, I intend to keep the 4 percent on the floor of the Senate.

One of the things that I intend to do is to try to bring those effects to their attention make them evident to them. For example, in Admiral Martin's written testimony here, he talks about how in fiscal 1973, at the end of our participation in the Vietnam War, the average age of our aircraft was 8.3 years. If you happen to have read it, sir, I do not want to repeat it.

But he goes on through the decade since to indicate where we went, and he indicates that today the average age of our aircraft inventory is 12.6 years, two-thirds of our aircraft are over 10 years old, and more than 50 percent are over 15. He goes into the idea of the operational tempo in the fleet and says it takes its toll on men and machines.

We are talking about freezing military pay and so on. The optempo takes its toll on men, all right. And many Senators say: Well, we will just reinstitute the draft; we cannot afford the voluntary force.

Maybe the draft can save us some money, but you are not going, by the draft, to be able to keep men in these machines in the air at night, half of them dying in peacetime in machines that are getting worn out, unless you reinstitute slavery.

I am going to be saying some of this stuff on the Senate floor, and I hope that my colleagues, including on the other side, are going to take some time, rather than just accept that we are going to make these cuts, to find out where they are now; to establish what the effects of these cuts are, because I do not think anyone out there is unpatriotic. I just think there is a lot of ignorance on this stuff.

Chairman GOLDWATER. The chairman has no idea of giving up the fight for 4 percent. I have just been thrown a ball that has hit me right square between the eyes of $18 billion. And like old Senator Dirksen used to say, if you talk it long enough it gets to be money. And I do not know where we are going to find $18 billion.

I am glad you mentioned TVA. That carries me back 20 years to when I was engaged in a cliffhanging election.

And I brought up the subject of TVA, and I still think I was right. I would give that to the States down there and let them run it, and let the people who use the power pay the taxes to build their schools and all that.

But you go ahead and fight that all out. I am not running.

If we have no other comments at this time, we can proceed with Marine General Smith, and you can say what you came to.

STATEMENT OF LT. GEN. KEITH A. SMITH, USMC, DEPUTY CHIEF OF STAFF FOR AVIATION, HEADQUARTERS, U.S. MARINE CORPS

General SMITH. Thank you, Mr. Chairman.

I, too, am experiencing the first opportunity to labor in the hearing vineyard. And indeed, when facing an $18 billion cut threshold, there is going to be a challenge of some proportion.

Like Admiral Martin, I have submitted a formal statement for the record, but I would like to highlight a few things as we go along.

The Marine Corps aviation element is an embedded part of naval aviation, and as such we procure, maintain and train together. We are also, on the Marine side, an air-ground task force with logistics elements. In order to prosecute any campaign successfully in which we might be involved it takes all three elements integrated together. These three elements are made up of people, things, and facilities.

I will touch on two of them briefly, and they are people and facilities. The efforts of this committee and the rest of the Congress as far as defense strengthening is concerned have had some profound effects. One of those effects is that four years ago our pilot attrition was around 14 percent; today it is 6.5. Enlisted retention is similar. We are retaining the best people and they are staying in record numbers due to modernization, stability in assignments, the improvement of the family lot, and meaningful training. Our Marines indeed consider themselves the cutting edge of the force.

The facilities, of course, are buildings that house trainers and training devices, maintenance bases, storage spaces, bachelor enlisted quarters, family housing, and all of those things that go with making jobs meaningful and feeling that people care for others.

On the things side, I would like to highlight a few of the programs which Admiral Martin has already talked about at some length. The first is the V-22A Osprey, which is replacement aircraft for our CH-46E. We consider this the most significant advancement in aviation since the development of the jet engine.

But that is not the important point. The thing here is that the CH-46E is getting old and, as indicated in the discussion by Senator Denton just a few minutes ago, is approaching the 20-year threshold. Its capabilities are limited, the V-22 gives us the opportunity to correct all those deficiencies and provide the lift necessary for troops and material to get ashore in time to establish a beachhead and prevail.

OSPREY

Senator **Bingaman**. Mr. Chairman, could I ask a question on this Osprey item? And maybe, Admiral, you would want to respond to this. I did not ask it when you discussed the program. I still see things in Defense Week and various publications about problems in this JVX program, getting the necessary commitment and donation from the various services.

Could you just state the extent of that problem today, either one of you, whoever wants to address it?

General **Smith**. Well, let me approach it this way. We consider the whole program a low-risk venture. We have had a scaled down demonstrator flown by Bell for 7 or 8 years. It has accumulated over 4,000 flight hours without incident.

It is not the full size, of course, that the V-22 is going to be, but element by element this program is coming along in the development stage better than any other airframe that we have brought on line to date.

Senator **Bingaman**. As to the question of the contribution from the various services for this joint program, you do not see a problem?

General **Smith**. At this juncture, no. We are, of course, developing it to meet Marine Corps and Navy requirements. The Army has indicated that they are going to come on board for 231 aircraft, and they will have the Marine Corps version. The Air Force is procuring 80, and they are paying for the differences in capability that they expect to see in the airframe.

Senator **Bingaman**. And that is your view, too, Admiral?

Admiral **Martin**. Yes, sir, indeed. And I echo General Smith's remarks about the possibilities for this airplane. It is revolutionary compared to our past thinking, and I think all services will find a very great use for it. And it is going to be one which we will find very useful in the future, and perhaps not only in the services but also in commercial applications.

Senator **Bingaman**. Thank you.

Senator **Glenn**. Mr. Chairman, could I ask a related question here, since the JVX has been brought up?

Senator **Humphrey** [presiding]. I hope that our witnesses will be allowed to continue their testimony, so that members can question under the usual procedure. Would the Senator from Ohio mind waiting until we finish? I know we made one exception. Maybe that was a mistake.

General, would you continue, please.

General **Smith**. Thank you, sir.

V-22

There are two other things to be said about the V-22. One is that it has a self-deployable capability of over 2,100 miles, and in the business the Marines are in as well as the combat effort the Navy needs it for, that is very, very important.

The second is that we recognize that there is a large ramp-up in cost this year, from $186 million to $604 million. But let me pause and emphasize that it is essential to build the engineering vehicles required for all of our test and evaluation work. We have a hard IOC of 1991. As 1992 approaches, we will drop below our essential capability to lift the assault elements of two combat regiments of Marines into the objective area with the existing CH-46 fleet.

We must have the V-22 to prevent that loss of capability for the Marine Corps and for this nation.

F/A-18

The next item a success story again, is the F/A-18. Let me just relate an exercise that we conducted to demonstrate the fighter capabilities of this airplane. A detachment of four F/A-18's took off from Marine Corps Air Station, El Toro and flew, with aerial refueling, to the Hawaiian Island chain, armed with two Sidewinders and two Sparrow missiles.

They arrived in the target area and waited for a range foul problem to be cleared before they could fire the missiles. There were four missiles fired and four direct hits, the aircraft recovered at Kaneohe Bay 8½ hours after takeoff. With less than 30 maintenance Marines these four airplanes operated air to mud or air to ground in a local training area for a week. The aircraft returned to Marine Corps Air Station, El Toro, and upon return all four airplanes were full mission capable. We do indeed have a strike fighter on our hands of some proportion, and are a major improvement over those that we are operating today.

The statistics of reliability and maintainability have all been related by Admiral Martin and I will not repeat them. It is a tremendous airplane and a tremendous capability.

AV-8B

Next is the AV-8B. I have already indicated that to date it has been accident-free, and that is due to engineering improvements which have been designed into the airplane to reduce the pilot workload. It like the F/A-18, is enjoying mission capable and full mission capable rates above 80 and 70 percent, respectively. This is phenomenal in comparison to the aging airplanes these airplanes are replacing.

In both the F/A-18 and the AV-8B, we have structured an enhanced attack capability for operations at night and in reduced visibility. Last year this program was initiated after the Congress had received the budget. With your support and the other committees' support, we now have those programs well underway. It turns night into day and gives us the capability to operate unrestricted in low altitudes, under the threat envelope of surface-to-air missiles. It also gives us the night time to operate effectively which before they denied because we did not have this capability.

A-6E

The A-6E to F upgrade is a significant improvement. Again, it is a design and engineering improvement program. So again, it will not only increase the capability, but the reliability of the airplane.

The CH-53E and AH-1T have been talked about. In the case of the AH-1T+, last year's budget bought the first 22 and this year's budget continues the buy of 22 more, for a total of 44. This is a force structure issue as well as a capability improvement issue. Equipped with the T-700 engine, it gives us a capability to operate in a high, hot environment. We were unable to accomplish that task before with the AH-1T, and the AH-1J. In addition, it introduces the Hellfire missile, which is again a significant capability improvement.

In the command and control business, our tactical air operations center, which is the heart of the command and control business for Marine air operations ashore, is being purchased. The United States Air Force as well as the Marine Corps are using common modules. There are two things significant in this program.

One is the reduction in logistics capability. Through fiber optics technology in cabling and other design changes, we have been able to reduce the logistics requirements by two-thirds. Where we once had three modules before, we will have one module with the logistics requirements attendant to it eliminated.

The engineered improvements in that system will give us the maintainability and reliability which has been so essential on the battlefield in the past and has sometime not been acceptable.

Within the Marine Air-Ground Task Force we have the Marine Wing Support Group (MWSG) and introducing new equipment there is as important as airplanes. Without the trucks to haul the material we cannot deliver ordnance, fight the war, or prevail upon the battlefield.

For your information, I am talking about the 939 truck. It is the first new vehicle which has been introduced to that organization since 1960. Concerning the business of mobility, the TAVB, which is a logistic support ship which will embark our Intermediate Maintenance Activities [IMA] and moves IMA support from CONUS airfields to wherever we happen to be based enabling us to prosecute the war.

The TAVTS gives us the capability to house, transport, and operate afloat from the initial introduction of Marines ashore supported by Admiral Martin's forces, until Marines secure enough real estate ashore to introduce those support activities required such as Intermediate Maintenance Activitities for aircraft and missiles.

The TAVB will be standing offshore and provide that capability. As ground is seized, it can be unloaded and the maintenance capability introduced ashore.

Not the least of our concerns is the modernization and equipping of our reserve force. As the AV-8B is introduced, it will relieve the A-4M, a very capable airframe, and it will migrate to the reserves. As the F-18 replaces the F-4, those F-4S's with the AVG-10 Bravo, which is a significantly improved radar over what the reserves are operating today, will be introduced to the reserves.

Of course, the KC-130T procurement continues. Without it our tactical mobility on the battlefield is significantly curtailed. The continued procurement of 130T's at the discretion of the Congress is sincerely supported.

Admiral Martin talked at some length about readiness, sustainability, modernization, and force structure. It is those four pillars that make a force viable, a reduction of any one significantly affects our capability to prosecute the mission, whatever it might be.

You have heard the word "balance" before today, and I would like to offer for just a moment, what that means. In the business of prosecuting a task no matter how low or high the threat might be, it takes a certain number of pieces of the force to prosecute it successfully. Regardless of whether it is the evacuation of Americans, providing stability for indigenous personnel, or whether it is all-out war.

The balance of the force which takes on the task in detail is what is going to give us the capability to prevail.

Mr. Chairman, I have touched on those things that are of significance to us. This is not to say that those things I have not discussed are unimportant. I would also be remiss if I did not come back to the V-22 one more time. It is a significant improvement in capability for the force, and it performs a function for the Marine Corps which is part of our life's blood. That function is the capability to perform vertical envelopment during the assault phase of a campaign. It is our highest priority.

Thank you for the opportunity to share a few words with you, and I look forward to attempting to answer your questions.

[The prepared statement of General Smith follows:]

PREPARED STATEMENT OF LT. GEN. K.A. SMITH, U.S. MARINE CORPS, DEPUTY CHIEF OF STAFF FOR AVIATION

Mr. Chairman; Distinguished Members of the Committee: Thank you for this opportunity to appear before you today to present my first status report on Marine Corps Aviation. With the steadfast support of the Congress, this past year Marine Corps aviation enjoyed its most productive year in recent history. In all categories, the indicators clearly point towards greater efficiency, productivity, and effectiveness which result in the conservation of precious men and material. Likewise, the modernization efforts which have received your continued support throughout past years are on speed and on course. My report to you today will focus on the direction of Marine aviation, its performance in 1984, and the programs which have been presented for your consideration in FY 86.

Marine Corps Aviation finds its genesis in the National Security Act passed by the Congress in 1947. Consistent with this statute, the Marine Corps is organized, equipped, and trained primarily as an amphibious force of combined arms featuring ground, air, and logistics elements. The principles which guide the employment of this Marine air-ground-logistics team necessitate a delicate balance between the number and types of supporting arms. These requirements provide a basis for a fully integrated, mission oriented, Marine air-ground task force (MAGTF) specifically tailored to prosecute any mission that may be assigned.

As the air supporting arm of the MAGTF, the air combat element (ACE) provides the equipment and forces which are a key component in the overall combat power equation of the MAGTF. By virtue of the mobility required of amphibious forces, Marine ground forces are relatively lightly armed and manpower intensive. Accordingly, the Marine Corps does not incorporate organically the heavy supporting arms and equipment to the degree or in the numbers which characterize many other modern ground forces. Instead, Marine aviation is structured to provide fully integrated, lethal, versatile and responsive firepower as well as tactical mobility and logistical supportability to the MAGTF Commander. This conscious and essential integration of air support requires continuous availability and permeates the full spectrum of Marine Corps capabilities. With an appreciation for the essentiality of Marine aviation in complementing the total Marine Corps capability, a framework for discussing the objectives of Marine aviation may be structured within the context of the four pillars of combat capability: readiness, sustainability, modernization and force structure.

No military force in the world views readiness with the same keen sensitivity as your Marine Corps. Readiness has been a trademark throughout our 209 year history. World events in just the past year have again demonstrated the readiness, flexibility, and ability of the Marine Corps to rapidly respond to the national command authority with unqualified effectiveness. As was demonstrated in Grenada, Marine aviation stands ready to support the ground and logistics elements as never before. Our top priority has been and will continue to be to build and maintain a ready, effective air support capability. Marine aviation training readiness has shown a growth of 19 percent over the past four years. With your splendid support, we have an obligation to provide continued improvement.

While readiness allows for the quick and decisive introduction of Marines, sustainability provides the Corps with the ability to continue the campaign to a successful conclusion. As you are aware, major gains have been recorded in this area over recent years, but much work remains to be done. In Marine aviation, growth to inventory objectives is on track; however, programmed ordnance, fuel, and spares must continue to be procured at the planned rate and to designated levels. Integral to sustainability is logistics simplicity. In this regard, we are intent on reducing the types of aircraft and equipment we operate. Also implicit in sustainability are not only the means for support, but the ability to transport and distribute these means as required. Our planned modernization is improving this capability too.

Modernization enables Marine aviation to provide its essential capabilities in an increasingly complex environment. Aviation has historically been the vanguard of rising technology in this century. Current trends reflect increased sophistication. For these reasons, Marine aviation seeks to remain competitive in its environment with thoughtful, prudent, and balanced modernization efforts developed with due consideration of reliability and cost along with realistic procurement in sufficient numbers to satisfy Marine Corps essential requirements.

Finally, force structure must be viewed with a dedication towards ensuring that adequate flexibility exists to meet the threat in every clime and place, while being ever mindful of potential demographic and economic changes. We continually review the structure of Marine aviation in order to realize the maximum possible gain from the resources available. The requested 199,500 Marine Corps end strength and associated aircraft and equipment will provide adequate force structure to sustain a balanced peacetime force capable of rapid expansion during mobilization. Even with the excellent equipment that you provide, our most valuable resource and the heart of Marine Corps aviation remains the individual Marine and the supporting family. Throughout our long history, the Marine Corps has enjoyed the dedicated service of the finest young men and women this Nation has to offer. Imbued with the values of patriotism, loyalty, and hard work, they have served the Corps and our Nation well. The young Marines of today are no exception. They are challenged to support, often in the austere circumstances of an expeditionary environment, some of the most technologically advanced equipment found in the world. It is due to their ingenuity and perseverance that I am able to report to you the exciting stature of Marine aviation today. I bring this to your attention because of the strong interest Congress has shown in the past concerning personnel, as well as supporting our procurement and operating issues.

Based on the efforts of Congress in the recent past, Marines today enjoy a higher quality of life and enjoy greater job satisfaction than ever before. As a result, Marine aviation is benefiting through unprecedented retention rates. Our pilot attrition, which was over 14 percent a few years ago, now stands at only six and one-half percent. Enlisted personnel, with their expert technical skills and irreplaceable experience, are staying at an unprecedented rate.

As the lives of these Marines have improved, so has their productivity. In 1984, Marine aviation enjoyed an overall aircraft mission capable rate in excess of 76 percent with a full mission rate of greater than 64 percent. This represents a growth of 13 percent mission capable and 28 percent full mission capable over the past four years. This improved aircraft readiness posture in effect provides the nation with the equivalent of an additional 11 squadrons of ready aircraft.

Concurrent with improvements in personnel and aircraft readiness, our operational performance has improved as well. Last year our tactical air squadrons flew 339,000 hours. This represents the most flight hours flown in a single year since Vietnam. Equally important in 1984 was the fact that Marine aviation enjoyed a lower aircraft mishap rate—4.65 rate per 100,000 hours—than ever before in its history. This past year we had only 19 aircraft mishaps compared to the 40 mishaps four years ago. In order to sustain this desired level of performance, however, we must continue to pursue a course of adequate flight hour funding combined with safe, professional execution. This involves continuation of the incremental escalation of our flight hour program which began in 1984.

As an outgrowth of increased personnel, aircraft, and operational performance, the combat readiness of Marine Corps aviation training readiness has improved 19 percent over the past four years. This has provided us with the unique opportunity to tighten the standards by which the combat capability of aviation units is measured. Additionally, innovative tactics are continuing to be developed and adopted to meet the challenges facing us around the world. At the forefront of Marine aviation training and tactical development is MAWTS-1, our weapons and tactics squadron at MCAS Yuma, Arizona. This organization not only serves as the focal point of tactical warfare development for aviation, but additionally trains highly skilled fleet aircrews who return to their units as instructors, providing a core of tactical expertise at the unit level.

While this past year's achievements are a source of pride, we are committed to the continued refining of our aviation fighting capabilities for the eventualities of the future. Our modernization efforts towards a more viable and effective fighting force continue. Fiscal year 1986 represents a critical year in the development of our medium lift helicopter replacement. The MV-22A "Osprey," formerly JVX, funding request is essential to the timely developmental production of the six aircraft required for test and evaluation. We believe the MV-22A to be the single greatest development in military aviation since the jet engine. The speed, range, self deployability, and versatility of the MV-22A far outstrips conventional helicopters, and promises tremendous flexibility for tactical employment of forces on the battlefield. The MV-22A wind tunnel tests are exceeding expectations in almost every category of performance. No problems are foreseen in this low risk program as we begin to scale up to full size from the existing 60 percent wind tunnel version. The introduction of the MV-22A is critical for the Marine Corps in order to overcome an existing tonnage lift deficiency and to avert a medium lift shortfall in 1991. For these reasons, the MV-22A is Marine aviation's highest priority program. Your foresighted support for its continued progress is crucial.

The F/A-18, which was introduced to the Marine Corps in 1983, has proven to be a superbly capable and reliable aircraft. We are operating three F/A-18 squadrons in the 3d Marine Aircraft Wing at MCAS El Toro, California. Our first squadron from the 2d Marine Aircraft Wing at MCAS Beaufort, South Carolina, is undergoing transition as I address this committee today. The year of 1985 will also see the first deployment of two Marine F/A-18 squadrons aboard Navy aircraft carriers. In 1986, two more Hornet squadrons will stand up at MCAS Beaufort, South Carolina.

The F/A-18 continues to exceed our expectations in both the air-to-ground and air-to-air role. In the air-to-ground delivery mode, pilots are achieving 35 foot circular error probable rates on combined deliveries. In the air-to-air role, the F/A-18 is an extremely impressive fighter which has proved it can meet all adversaries with confidence.

The reliability and maintainability of the F/A-18 is unprecedented for a system of its complexity. Marine Air Group 11, our first F/A-18 equipped air group, completed fiscal year 1984 with an average annual F/A-18 availability of 81 percent mission capable and a heretofore unheard of 76 percent full mission capable rate. As a result, the maintenance man-hours required to support the F/A-18 have been reduced to less than half those required of its predecessor, the F-4. As with the introduction of any new aircraft however, the F/A-18 has not been entirely without problems. A great deal of publicity surrounded the vertical tail cracks on the F/A-18. Let me state that the cracks resulted from flight at the extreme edge of the operating envelope, and they are being repaired to our satisfaction. The manufacturer has accepted funding liability, and we will be back on delivery schedule in May 1985. We in the Marine Corps believe the effects of this small program perturbation pale in comparison to the capability of this outstanding aircraft. This year's proposed total buy of 84 aircraft will enable the Marine Corps to continue its transition towards 12 fighter squadrons on schedule.

Our other major modernization and transition effort, the AV-8B, accelerates during this year. The increase from 32 aircraft funded in fiscal year 1985 to 46 aircraft in fiscal year 1986 allows the Marine Corps to procure this aircraft at a more efficient production rate. On 30 January 1985, VMA-331, the first tactical AV-8B light attack squadron, completed transition at MCAS Cherry Point, North Carolina. Eleven AV-8B's have been delivered to the Marine Corps to date, and the aircraft is exceeding expectations in handling, reliability, and ordnance delivery accuracy. As you may recall, the AV-8B's performance doubles the range or payload of the AV-8A. The unique VSTOL characteristics allow the Harrier II to be operated from a variety of sites, including forward positions near to the ground forces it was designed to support. This forward and remote site capability allows exceptional deployment and employment flexibility, including a lack of dependence on complete, vulnerable air bases as well as a reduced reaction time for air support.

There remains, however, a pressing need for a two-seat trainer version of the Harrier II, the TAV-8B is the only modern tactical jet aircraft in the United States that does not currently operate a two-seat trainer version. As we approach 1987, our introduction schedule calls for the conversion of A-4M light attack pilots to the VSTOL light attack AV-8B at a rate near 120 pilots per year. The TAV-8B is scheduled to enter the force in that time frame and to support the safe and efficient conversion of those pilots. Adequate funding is included in the proposed 1986 budget for the continued development and timely delivery of this aircraft. This is a high priority program, and we urge your support.

We continue in the 1986 budget with our efforts to improve our night fighting capability through night attack enhancements for the AV-8B and F/A-18. Last year Congressional support ensured the initiation of this low cost, highly effective capability with a strong program endorsement. The AV-8B will lead this initiative with the same systems following in the F/A-18. For the AV-8B, the night attack package includes a fixed FLIR, night vision goggle compatible cockpit lighting, heads down display, and a rasterized heads up display. The F/A-18 utilizes the FLIR capability in a pod configuration, with a rasterized heads up display, night vision goggle compatible lighting, and a digital map. One benefit of this program is that one research and development program supports both aircraft. At this time, negotiations with the British government are underway to cooperate on research and development costs which could further reduce developmental costs. This night enhancement effort will enable Marine aviation to effectively fight these two aircraft at night and under reduced visability.

The Marine Corps continues its support of efforts to upgrade the A-6E to the A-6F. The combination of planned improvements offers enhanced capability, survivability, and reliability for the A-6E. The upgrade includes the introduction of new engines, improved radar systems compatible with the planned advanced medium range air-to-air missile, updated electronic countermeasures for increased survivability, as well as engineered reliability improvements to reduce maintenance manhours and mean time between failures. The durable A-6 has served the Marine Corps well as an all weather medium bomber, and the program requested this year will ensure continuity of this essential capability into the next century.

The CH-53E is one of the Department of the Navy's two multi-year aircraft procurement programs, approved in fiscal year 1985. This multi-year procurement starts in 1986 and enables the Department of the Navy to realize a savings of $103 million over four years. The CH-53E, the most powerful helicopter in service in the free world, provides the Marine Corps with a solution to its heavy lift requirements to the year 2000 and beyond. The aerial refueling capability inherent in the CH-53E makes it self-deployable. In a recent demonstration, four CH-53E's flew non-stop from MCAS Yuma, Arizona, to MCAS New River, North Carolina. After three aerial refuelings and 14 hours elapsed flight time, all aircraft arrived at their destination, all fully mission capable. We now have two fully operational, 16-aircraft squadrons, one on each coast. Last November, our third CH-53E squadron, HMH-466, was formed in MAG-36, 3d Marine Aircraft Wing at MCAS Tustin, California.

For our medium lift requirement until the arrival of the MV-22A, a series of survivability, reliability, and maintainability (S,R,&M) modifications are planned to sustain the CH-46E medium helicopter force. The first two S,R,&M prototype aircraft have been modified with fleet deliveries expected to begin during fiscal year 1986.

In the attack helicopter structure, a second year buy of 22 AH-1T+ aircraft is also included in this year's budget request in order that we may fill existing inventory shortfalls. The previous support of the Congress in fiscal year 1984 and fiscal year 1985 has been critical to the success of the AH-1T+, and your continued support for 1986 is requested. This versatile attack helicopter incorporates the T-700 engines which allow it to be operated in the extreme high/hot environments of the world. Additionally, the Hellfire missile, with its increased range and lethality, will be introduced with the AH-1T+. Concurrent with the procurement of the new aircraft, the existing AH-1T's will be retrofitted with both the T-700 engine and Hellfire. Test and evaluation of both enhancements have progressed without difficulty and have verified the performance benefit of these two initiatives.

Aviation ordnance developments and stocks are designed to ensure that precision weaponry in the proper quantities is available for employment in support of ground forces. The Laser Guided Maverick is specifically designed to fill a precision guided munitions requirement in the close air support role. This year's request continues procurement of this valuable munition. Additionally, for deep strike interdiction, the Imaging Infrared Maverick procurement begins with this year's submission. The I^2 R Maverick provides the potent punch needed in deep enemy target areas. Finally, Hellfire procurement is included as an anti-armor precision guided munition designed for low speed delivery by helicopters. The increased standoff provided by all these lethal munitions provides greater platform survivability without degrading effectiveness. Procuring and maintaining adequate stocks of these weapons will be critical to success on the modern battlefield.

Efforts to modernize our command and control systems will come to fruition in fiscal year 1986 with the initial procurement of four TYQ-23 air operations modules for our Tactical Air Operations Center (TAOC). The modular design of this system, the Tactical Air Operations Modules (TAOM), offers a unique ability to tailor the size and capability of this command and control system to the needs of the aviation force it supports. TAOM is urgently needed to replace the bulky, less effective and aging 20-year-old equipment utilizied today.

As we enhance our capability to accurately and expeditiously identify air threats, our ability to defend against those threats continues to improve. As an example, the highly effective Hawk missile system has been equipped with an optical tracking capability to complement its formidable radar system. An expansion of our active and reserve Hawk battalions begins this year with the addition of a third firing section to each battery. This addition provides a 50 percent increase in simultaneous threat engagement capability per battalion. Similarly, our Forward Area Air Defense Batteries will continue to receive the handheld Stinger missile with its significant improvement in capability over the older Redeye missile system it replaces.

Modernization efforts are not restricted to weapon systems alone. If Marine aviation is to logistically sustain our warfighting capability over time, aviation support organizations and their equipment must be modernized at a pace equal to that of operating squadrons. The primary organization responsible for logistically supporting the Marine Air Wing is the Marine Wing Support Group (MWSG). This unit is organized and equipped to provide the full range of logistical support functions from Tactical Air Fuel Dispensing Systems to runway repair, and is an integral part of the air wing. We continue to review the MWSG organization with the intent towards making it more effective and efficient. In terms of equipment modernization, the M939 5-ton truck is replacing its 1960's predecessors; and, for the first time opportunity exists to fulfill inventory requirements.

Another aspect of force modernization is the Aviation Logistic Support Ship (TAVB). The TAVB provides a dedicated sealift vehicle for moving an aircraft Intermediate Maintenance Activity (IMA) to the objective area. The TAVB will transport mobile maintenance facilities for both fixed and rotary wing maintenance which can be displaced ashore as the situation permits. Additionally, the TAVB provides aircraft component sustainability which precludes the purchasing of a 30-day packup to support an MPS mix of aircraft.

Finally, essential military construction requirements tied directly to the standup of new aviation weapons platforms are being met in a timely manner. These facilities include housing for sophisticated cockpit trainers, aircraft hangars, and warehouses. All of these logistical and support improvements are designed to ensure that Marine aviation can train, deploy, and employ its assets in a timely and flexible manner while sustaining those forces over time.

The modernization of our active forces has also allowed Marine aviation to outfit Reserve forces with more capable aircraft, as well as the opportunity to achieve commonality in future years. As our light attack force is transitioned to the AV-8B, the A-4M, a highly capable conventional light attack aircraft, becomes available for Reserve modernization. The A-4M is equipped with a more powerful engine and contains the angle rate bombing system not in the presently assigned A-4E/F. Similarly, more AH-1J attack helicopters will become available for Reserve squadrons, thus allowing the shortfall in Reserve attack helicopters to be alleviated. Additionally, the Hellfire missile system introduced in the AH-1T+ will be retrofitted in the AH-1J. Again last year, Congressional action provided two additional KC-130T's for our existing Reserve KC-130 fleet, and offered the Marine Corps the opportunity to stand up a second Reserve KC-130 unit in the future. The three Reserve fighter squadrons will continue to receive the F-4S's freed up as F/A-18's are introduced to Active forces. Future plans include F/A-18 introduction to Reserve forces during the 1990's. Additionally, current plans are to introduce CH-53E's and MV-22A's into the Reserve force. Our long range goal is to reduce the number of aircraft models actually flown by Reserve squadrons, and provide as much commonality with the Active force as possible. This will substantially improve aircraft interoperability and maintainability.

The continued support of the Congress in the past has enabled Marine Corps aviation to modernize, bringing significant productivity and effective improvements to provide the requisite support for ground and logistics forces. In the past, innovative yet low risk, cost effective initiatives have been a trademark of Marine acquisitions. This was achieved by bold direction, prudent expenditure of scarce resources, and the never waivering support of Congress. Fiscal year 86 and beyond offers today's force the same challenge, and we stand committed to the same ideals. Your continued support is sincerely appreciated.

Senator **Humphrey**. Thank you, General. Senator Glenn?

JVX

Senator **Glenn**. On the JVX, General or Admiral, either one, we have seen development costs go up from 2.4 to 3.7, I believe. Just as a general rule, cost growth in research and development usually results in cost growth in the procurement. That is a pretty horrendous increase, and the chairman just stated our difficulties on the budget.

I understand you are continuing to base procurement of the V-22 on the same estimate that produced the underfunded R&D program. Now, if the procurement cost of JVX increases by 30 percent consistent with the forecast of increased development, are we going to be able to afford this, I guess would be the next question. What are you forecasting in the way of growth or cost?

General **Smith**. Senator Glenn, let me start out. I am sure Admiral Martin and Admiral Busey both will have observations to make here.

First, the program is going to come in at under 2.4 in development costs.

Senator **Glenn**. Come under?

General **Smith**. At or under.

Now, there are things that are done in the development of a program when they are a gleam in their father's eye. As time progresses and the technology develops they can change. In order to contain this program, one of those things that we have done was to drop out the interim engine which is a significant savings. We are able to do that because of the confidence that has developed in the engine competition for this airplane which enables us to meet the IOC with the engine that is going to be in the airplane.

Additionally, we have reduced one test article because of the satisfactory progress in the scale-up efforts in the wind tunnel tests. We feel we can do without that article, which we had in originally because of our unknown opportunities that have since had some visibility shed on them by the wind tunnel tests and by the continued successful operation of the XV-15 technology demonstrator.

Senator **Glenn**. You feel these are faulty figures, then, that the 2.4 is not expanding up to 3.7, and saying that has been the research and development cost? It will not be? That is not a valid figure?

General **Smith**. It is time for me to call on Admiral Busey.

Admiral **Busey**. Well, Senator Glenn, I think those figures were used at one time or another, and they were primarily based on preliminary cost estimates using our NavAir in-house cost estimating procedures and based on contracting and marketing information.

We have capped the program, as General Smith has mentioned, at $2.4 billion in then year dollars. It is the figure that we are working toward. The contract negotiation process with the Bell-Boeing team is in progress right now. We feel very confident that the risk in this program is acceptable, that the cuts that we have made on the part of the Department of the Navy to achieve that figure are acceptable risks, and we fully intend to move toward a contractual document that will control the cost growth during development.

Senator **Glenn**. All right. I share with you that if this thing can be brought into operational use the innovativeness of it and what it does to tactical warfare is a huge leap forward. It is probably the biggest thing that has come in since the introduction of the helicopter way back in the fifties in a major way. It gives a lot of versatility, increased speed, range, reduced vulnerability, and a lot of things that you are more aware of than any of us here.

But while it may have the potential of revolutionizing tactical power projection, I think this continued budget crunch we are in is something we are going to have to watch very, very carefully on that thing, no matter what, how much advantage it gives us.

The chairman just stated the problem a while ago. I have had my own little list of suggestions that I may give to him separately, on the MX and the DIVAD, the Bradley, and some of our stockpiling of the central command or formerly RDF things, where I think we can save probably $8 or $10 billion in some of these areas, particularly without hurting our combat capability in a substantial way.

But nevertheless, the budget problem is going to be with us for a long time and I think it is up to you to make sure that that is taken care of.

LACK OF ADEQUATE TORPEDOS

Gentlemen, one other area too. In this previous Navy testimony here in another area that we talked about, we discussed the lack of adequate torpedoes. We do not have enough for a full load of torpedoes if they go out and fire the first load, and that is a little preposterous. We spend billions of dollars on attack submarines. We can say that it is under a full second load. It is actually about one and a half. We only have—if we went out and fired all the torpedoes we have right now, all those things would be able to do is sit out there and fire water slugs at somebody from them on, after that next half-load.

Now, that is a little preposterous, and so I have been very concerned that from an operational standpoint, being really able to go to combat, that we have adequate munitions to use on all this great equipment that we are buying. And I share your optimism on the systems you are talking about.

But what I would like is a little rundown on the major areas of concern that you have, whether it is the AIM or the Phoenix or whatever, as to where we are short of weapons to put on these things. It is all great and go out and fly around out there in a high-speed single place transport, but it does not do any good unless you have something to shoot at somebody when you get there.

And I am very concerned about the missiles and the bombs and whatever we have. And I would ask now that, rather than go through a complete analysis, that you supply that for the record weapons system by weapons system on what we have available to go into combat and how we could sustain combat. And I know in my time allotted here this morning—if you would just take a minute or so, though, to explain where you see the biggest shortages, because it does not do any good to buy this stuff if we do not have anything to hang on it or shoot off of it.

[The information follows:]

WEAPONS STATUS

	Fiscal year—		
	1985 factored assets	Percent 1985 planning objective	Percent 1990 FDP planning objective
Sparrow/AMRAAM			
Sidewinder			
Phoenix			
Harpoon (AIR)			
HARM		[Deleted]	
Laser Maverick			
IIR Maverick			
Sidearm			
Hellfire			

Note: Sidearm is a unique case in as much as they are produced from a limited number of modified obsolete Sidewinders. From this obsolete inventory at best [deleted] of the fiscal year 1990 Funded Delivery Period (FDP) planning objective. A new production missile to meet the requirement has not yet been identified.

Note: Figures deleted from table.

Admiral MARTIN. I would be very pleased to address that, Senator Glenn. Again, I have just returned from command of the Sixth Fleet, having arrived in Washington, as I said, less than a week ago. My greatest concern as a fleet commander was sustainability, and particularly in the air-launched missiles, either air-to-air or air-to-ground, and in ordnance generally.

My concern was real-time concern, and since I have come back I am very pleased to see what has occurred in the last 4 years in terms of improved funding for the procurement of munitions. And I will ask my colleagues to correct me if I am wrong, but I think the funding profile has gone up 65 percent for the procurement of ordnance and munitions during the last 4 years.

I have some backup slides that I will show, just as an overview. If you could show the slides on the profiles of our bins, our requirements versus our on-hand assets or funded assets.

[Slides deleted.]

This is long-range air to air missiles, our planning objective versus what our inventory is. But the improvement in 4 years has been 65 percent.

Senator KENNEDY. Well, if the Senator would yield, do I understand that you are not even at 50 percent now? Is that correct? Or you do not even project that by 1990 that you will be at 50 percent?

Admiral MARTIN. That is correct, sir, of the planning objective.

Senator **Kennedy**. Well, what is the significance? I welcome the fact that Senator Glenn has raised this issue and I will come back to it on my own time, John. But I think in the information you are going to provide the committee, I would hope you would also include when you believe that you will reach the objective and what the implications are of failing to reach that objective.

Admiral **Martin**. We will provide that for the record, sir, that information that Senator Glenn asked for.

Senator **Glenn**. My time is up, Mr. Chairman. What I would like to do is ask you to give us a complete rundown on this weapons system by weapons system on combat capability. That is, you can have planning objectives, and I trust those planning objectives relate to a sustainability factor if we went into combat. That is the only thing that means anything, is whether you have something to shoot if the war starts.

CROSS-DECKING MUNITIONS

And you are still cross-decking a lot of munitions, supplies, and things back and forth. It is my understanding cross-decking means you just transfer it from one ship to another because we do not have enough for both ships.

Admiral **Martin**. That is correct.

Senator **Glenn**. That is about as stupid a thing for us to get into as I can possibly think of. And I know it is not your fault. You have not been the one that did not want those munitions out there. I am talking more to ourselves here, I guess.

But you know, we all think it is grandiose and glorious that we have got all these high-speed supersonics, we can go Mach 2 and we can do all these things. But they're just nothing but one-space transports unless we have something to shoot off them. And I hope that receives the emphasis from you in your presentation of figures to us that it deserves.

And my time is up.

Admiral **Martin**. Sir, may I ask Admiral Busey to add onto those comments?

Admiral **Busey**. If I might very briefly add to that, Senator Glenn. As you know, these air-to-air missiles and the air-to-ground sophisticated missiles are very expensive missiles. So we are, of course, constrained in the numbers that we can accumulate in our ordnance magazines by the cost. But we are taking steps to change that.

We are second sourcing the Phoenix missile and we intend through competition to drive the cost of the $900,000-some odd per missile significantly down. We have the Sparrow missile, the AIM-9M missile, with two producers ramping up significantly. This fiscal year we see the cost coming down, the inventory mounting.

The same with the Sidewinder, the AIM-9M missile: two contractors in competition for each annual buy and through competition we are beginning to see the results of the unit costs of these very, very expensive air-to-air weapons coming down, and consequently we are able to buy more missiles. In the last 2 fiscal years, we have been able to come back to the Congress and ask for increased numbers to be authorized so that we can use the dollars we are saving through competition to buy more missiles.

Senator **Glenn**. Well, if you can give us a whole rundown on that for the committee, weapons system by weapons system, what you need if you were going into combat—and I suppose that is what your objectives were over there—if you can give that, and please let me know personally when you are submitting that or give me a separate copy of it. And that would be classified, I am sure, so let me know about it.

Thank you, Mr. Chairman.

Chairman **Goldwater** [presiding]. I just got back in the office here. Who is up?

Senator **Denton**. I have not asked one yet, sir.

Chairman **Goldwater**. Go right ahead, Senator.

Senator **Denton**. Thank you, Mr. Chairman. I applaud the thrust of and expertise of the questions that were just asked and the answers given, because they tend to amplify or clarify the effect of further cuts. If you force the military into certain positions by reducing the budgetary allocation to them, they are going to do things like squeeze their people on how much time they spend at home, short out on the weaponry, and keep the platforms, hoping to God they will get the weaponry some day, and that sort of thing.

RUDMAN PROPOSAL

There was a proposal by Senator Rudman, which is quite popular even on our side of the aisle, and it would have, I am told, the effect of a 4.4 percent decrease in defense spending this year. It has some rather popular sounding things in it, including cutting out so many hundred thousand civil service workers and so many hundred thousand support personnel.

I have learned that the support personnel that he would cut out would include such men as those involved in command and control, logistical distribution, and training. And DOD admits that they have an inadequacy of occupational codes to determine combat function. To illustrate that most graphically, I note that first sergeants of infantry companies are arbitrarily classified as administrators or as clerks.

Nobody on the other side seems to be hearing this, but this is an example of not knowing the effect of what you are trying to do.

PILOT RETENTION PROBLEM

We are also being questioned by Senators on the Appropriations Committee, the Navy is, about the bonus that you give to pilots, the AOCP thing. Why do I not ask you guys to realize that what the chairman says is true. We are facing the possibility—he calls it a likelihood and I do not question his judgment. He has been here a lot longer than I and has a lot more experience with this body and with the Congress in general.

So I am asking you to keep that in mind that, rather than, say, emphasizing the side of how things are a whole lot better since you took over or whatever, that you talk about the effects in very clear terms, for example on the pilot retention problem.

Admiral Martin, retention of Navy pilots has dropped sharply, and I have just been given a piece of paper here dated 13 February that came over as an answer to a Senator. It says that the projected second tour inventory of pilots is 163 for NFO's, and 90 for pilots, but that the projected second tour requirement for both—and this is in the VAM and VAQ communities—is 309 and 209.

This means a projected shortage of 146 NFO's and 119 pilots. That is a shockingly large number. That means a lot of nuggets are going to be flying those planes off the carriers. Now, if this kind of thing is not brought out at this juncture, you are going to lose your readiness, you are going to lose your weapons, you are going to lose the ability to provide the security of this country.

If that is not made conspicuous in terms that Senators who have a lot of things on their minds—the budget has to be cut, we have a deficit which can ruin the country, and so on—if they do not realize the effect on the mandate to provide for the common defense of the cuts they are recommending, they are going to make those cuts. It is going to be partially our fault—that is, the military community's fault—if we do not present our case.

Would you have any comments about the shortages in pilots that you are facing, or did those occur or appear to you, Admiral Martin, over in 6th Fleet? Or have you, since you have gotten back to Washington, faced that problem?

Admiral MARTIN. I welcome the opportunity to address that, Senator Denton. We are very concerned with the shortage, the projected shortages of pilots in the Navy, and this is due to several reasons, one is the very high OP tempo as a result of national command authority-directed contingencies, postures, and so forth.

The airline hiring issue right now—and I looked at a series of graphs the other day in which we superimposed the pilot resignation requests to the airline hiring profile, and they track very neatly, with a slight lag.

If we do not retain our pilots, two things occur. One, we have to train other pilots to fill those seats, and the cost of training a pilot today is approximately $1 million.

Second, we lose experienced pilots and therefore have a less experienced group coming in to fill their places. And I would anticipate the accident rate would increase as a result. I attribute our very fine record last year to the policies that have existed which have led to a very strong retention of pilots, and we are going to see this drop off. Maybe we have seen this already.

In fiscal year 1980 pilot retention was only 30 percent. We were 2,500 pilots short in 1981. On the other hand, in 1983 the retention was up to 58 percent; and in 1984 it dropped only slightly to 56 percent.

The improving economy and the airlines' hiring, are the two major things that are causing this, coupled with the OP tempo and long periods at sea.

Senator DENTON. Thank you.

I will submit for the record the projected second tour inventory and projected second tour requirement from John Lehman, dated February 13, for what it is worth: medium attack/ECM, light attack fighter, carrier ASW, helicopter carrier AEW, helicopter transport, ECM/Communications, patrol, and force support.

And on the face of it, it is devastating; a projected difference between requirements and what will be projected to be in the inventory.

[The information follows:]

Department of the Navy,
Office of the Secretary,
Washington, DC, February 13, 1985.

Hon. Ted Stevens,
Chairman, Subcommittee on Defense, Committee on Appropriations,
U.S. Senate, Washington, DC.

Dear Mr. Chairman: Because of your interest in Aviation Officer Continuation Pay (AOCP), this letter is to advise you of action the Department of the Navy is taking to enhance the program in 1985.

AOCP has been an extremely effective bonus program for retaining experienced pilots and Naval Flight Officers (NFOs). Its effectiveness has been conclusively documented through reduced aviation mishap rates, improved squadron readiness and improved retention. With a dramatically improved economy and renewed demand from the airlines for our highly qualified aviators, we are now seeing a decline in aviation retention. This trend is of utmost concern since it is especially acute in our tactical air (TACAIR) communities where the losses are least affordable. As an immediate measure, we are implementing a lump-sum payment option for TACAIR pilots only. Other eligible aviators, principally in sea-based communities will continue to receive AOCP in annual payments. We shall be submitting a request for additional modifications to restore the strength of the bonus later in the year.

To implement this payment plan, an additional $9.3M is needed and will be absorbed in FY 1985 MPN funds within the MPN appropriation. This will of course be directly offset by out-year reductions.

AOCP remains a critical bonus program for retaining our young aviators on active duty. It is being applied only to pilots and NFOs in those communities where shortages persist. This "targeting" philosophy will remain part of our future programs.

An identical letter is being sent to Senator Goldwater and Representatives Addabbo and Aspin.

Sincerely,

John Lehman, *Secretary of the Navy.*

[Enclosure: Updated listing of aviator shortages.]

AVIATION SHORTAGES

Community	Projected Second tour inventory	Projected second tour requirement	Projected difference
VAM/VAQ (Med. Attack/ECM):			
NFO	163	309	−146
Pilot	90	209	−119
VAL (Lt. attack):			
Pilot	166	351	−185
VF (Fighter):			
NFO	165	317	−152
Pilot	139	317	−178
VS (Carrier ASW):			
NFO	125	217	−92
Pilot	80	150	−70
HELO:			
Pilot	558	1,194	−636
VAW (Carrier AEW):			
NFO	103	150	−47
Pilot	57	108	−51
VRC (Carrier Trans):			
Pilot	35	150	−115
VQ (ECN/Comm):			
NFO	114	175	−61
Pilot	67	142	−175

AVIATION SHORTAGES—Continued

Community	Projected Second tour inventory	Projected second tour requirement	Projected difference
VP (Patrol):			
NFO	339	317	+82
Pilot	387	401	−14
Force support:			
Pilot	40	50	−10

A-6 WINGS

Senator **Denton**. More critically, what were you getting at, Admiral, with your discussion of the A-6 wings? It appears to me that there was some rather scandalous talk about the fatigue life of the wings of the A-6's, and maybe the implication that they were not being manufactured right or something. It seems to me that you are indicating here that what you had was an original assessment of fatigue tests, which indicated in 1964 a fatigue life of 2,250 hours, and then after a good deal of actual fleet data you went to a fatigue life extension to 4,400 hours.

Then, as a result of further utilization under increased weights and maneuvering loads, you got back to the original 2,250. Are you trying to imply that things are okay there, that we just made an excessively optimistic projection in the middle, and there is nothing really wrong?

Admiral **Martin**. I will initiate this and then ask Admiral Busey to amplify.

Senator Denton, the initial A-6 wing life was 2,250 hours. During the sixties, in examining the methodology used for computing fatigue life, the Navy came up by using the standards and the means of that time, and said this wing should last to 4,400 hours.

Senator **Denton**. In the early seventies, right?

Admiral **Martin**. Yes, sir.

As time went on and we started seeing some fatigue cracks, we went back and evaluated the methodology and the means with which the fatigue life was computed, and this has been in recent years. As a result it was determined that indeed the 2,250-hour projections formulated when the wing was manufactured were correct. The methodologies for extending it to 4,400 hours were not valid.

I do not think it should be scandalous, because the wing met or exceeded specifications. But now the issue is to re-engineer and design a wing to replace those that have reached or passed the 2,200-hour benchmark and also for the A-6's of the future.

Admiral Busey, would you care to elaborate?

Admiral **Busey**. Yes, sir. Admiral Martin is correct here, Senator. There is no implication to be gathered from the data at all that Grumman is not delivering to us a wing which complies with the specifications that we called out. We must keep in mind, though, this is a 25 year old design. The testing continues to tell us that we have got a 2,250-hour wing life.

When we initially procured the A-6, we did not intend to keep it in service beyond 20 years. We have confirmed the analytical analysis now by the actual tear-down of, I believe, three wings. We are finding increasing cracks and opportunities for cracking because of the construction and the design that is 25 years old, which would lead us with that 2,250-hour wing to have to rewing that aircraft probably three times during its useful service life.

Senator **Denton**. I think I understand it. I do not want to prolong the discussion, but that is why you ended up grounding 76 of the highest fatigue usage aircraft and restricting the operating envelope of another 113 to 4.5 G's or less, because you retrospectively found that the original limit was correct and that therefore for safety you had to do that. Is that correct?

Admiral **Busey**. Yes, sir.

Senator **Denton**. May I ask how much time I have left, if any? I am sorry, Mr. Chairman, I see my time is up.

Chairman **Goldwater**. Senator Kennedy?

Senator **Kennedy**. Thank you, Mr. Chairman.

SUSTAINABILITY

If I could just come back to the issue which Senator Glenn raised and which I think is of great importance and significance. And I think, Admiral Martin, you have indicated, as someone who has been out in the fleet for some period of time, your own very great concern about the issue of adequacy of the ordnance.

We have over the course of these hearings, we hear at the start of the hearings Secretary of the Navy Lehman and his personnel in the Navy and others talk about the planning and the mission for our armed services and for the military. And we get into the amounts of equipment and the kinds of aircraft and ships that are necessary to carry forward that particular mission.

We come down to during the course of these hearings where we discuss the whole issue of ordnance and the adequacy of supply. This is not a new issue. And we see a chart on this, as you have indicated there, where even in the outyears you are not going to be able to achieve even 50 percent of what the requirement is. And that has to reflect, I would think, on the capability of the Navy to carry forward its mission, as has been outlined to us.

If there is not going to be the adequacy, as you have outlined it, of the necessary ordnance, I would think that that would have to give you some pause either on the question of the affordability of the various ordnance or of the mission. You cannot have—I would think, be able to carry forward the mission of we are not going to have the ordnance that is going to be necessary to carry that forward.

And so I would think, even under the existing budgetary implications, that there has to be at least some kind of adjustment in order to have some degree of consistency. And I am just interested. I know you are going to provide the figures to the committee as Senator Glenn has mentioned.

But what are we supposed to expect in terms of the matchup in capability and the platforms and the ordnance shortfall? Because there is nothing, at least in the air-to-air missile chart that we just saw there, nothing to indicate that you are going to reach the requirements in any reasonable or perceptible timeframe, and that has to have some important implications in terms of capability.

And I would just be interested if you would just elaborate a little bit about what we are going to do about it. Something clearly is wrong.

Admiral **Martin**. Senator Kennedy, as I indicated, the issue of sustainability was one of my primary concerns as a fleet commander, as it is of the fleet commanders in chief. I think this has been recognized, particularly in the last few years, and for this reason additional, considerably additional funding, as opposed to say the late seventies, has been infused to the procurement of these missiles and sophisticated systems which are very expensive, in order to improve our stockpiles.

This has been recognized and done. It is also an issue of affordability with respect to the total package. From what I have been able to learn just in a very short period of time, I think we are very definitely on the right track.

It is recognized, but you cannot stop, say, procuring aircraft and put all of that money into missiles. It has to be a balanced, and it has to be an affordable, program.

Senator **Kennedy**. Well, I quite agree that there was no question about the shortfall a number of years ago, at the end of the seventies, and that there has been an effort to try to, as you have outlined in your earlier responses, an effort to try and adjust that.

Quite clearly, the effort is not going to meet the objective even as we are going at the present time, certainly not according to that chart in one particular weapons system. And I think, whether we are talking about the Phoenix or whatever it is, we understand that they are exceedingly expensive weapons or ordnance systems. And I think even with the stepup in terms of the commitment by the Navy and the Marines, I expect we are still going to see a very significant shortfall. From the charts that I have seen, we are not going to achieve the objectives even up to 1990 with the flow line that has been outlined by the Defense Department.

And that has to have some direct implications, I would expect, on capability, and that is what I am driving at. It seems to me that we ought to at least be able to see some kind of chart that is going to show that we are remedying that or that, at least in terms of your own priorities, that has a lesser priority than the ongoing purchase of additional kinds of weapons systems. And that I find to be troublesome myself.

Admiral **Martin**. Yes, sir; I certainly agree it is troublesome. As I indicated, that has been recognized. We are attempting to at least partially satisfy the filling of the bins.

Senator **Kennedy**. I will be in touch with Senator Glenn or the staff. And could you indicate to us what it would take over the next period of time, whatever is a reasonable period of time, to make sure that the estimates that it costs to make sure that you would be able to reach your objective on that.

This is an area I think there is a very considerable degree of support for in the Congress, and what would be—if you could give us some flow lines, over a period of time you could achieve it and what the cost would be. So, that would supplement what Senator Glenn would have by this, and perhaps we can work out a somewhat more precise area of questions of what we want than just what we have indicated here today.

But I would be very, very interested, and I think others who are concerned about this issue would be very interested, about what is really needed by the Navy to be able to achieve this in a reasonable period of time. You could give us a couple of different flow lines, I would expect.

My own sense is that there is very broad support in the Congress for it, and it seems to me, quite frankly, to be one of the very high priorities.

F-18

If I could just move into a couple of other areas, as you know—you talked earlier about the F-18, and last year we inquired of the Navy about the all-weather capability for the F-18.

What is your expectation now in terms of the all-weather capability for the F-18? When will that be available? Could you tell us that?

Admiral **Martin**. Could I ask Admiral Moranville to address that, please.

Admiral **Moranville**. The Congress funded an austere all-weather capability for the F-18 last year at about $35 million. We are going to proceed with that plan, but I must tell you that does not give the F-18 the capability of the all-weather A-6. It doesn't have the radar that the A-6 has. We are going to have a two-seat version of it, and eventually we may have to grow the radar if we expect that airplane to in fact replace the A-6.

Senator **Kennedy**. In the budget, could you indicate to us what the funding requirement is for that?

Do we have that in the budget?

Admiral **Moranville**. We have not requested beyond the austere version.

Senator **Kennedy**. Could you let us know what that cost would be? Could you supply that for us?

Admiral **Moranville**. Yes, sir; we can provide that for the record.

[The information follows:]

All-Weather F/A-18

Contractor estimate for the F/A-18 radar upgrade to provide all-weather capability is on the order of $172 million. A two-seat, full all-weather F/A-18, as briefed to the Navy's Blue Ribbon Oversight Committee in October 1983, which would include the radar modifications for all-weather, 460 gallon external fuel tanks, six inch high resolution digital cockpit displays, 3,000 pounds additional internal fuel, upgraded F-404 engines, and high lift devices is estimated by the contractor to cost on the order of $550 million. We have not budgeted for either the all-weather radar upgrade or the two-seat, full all-weather aircraft.

Senator **Kennedy**. Last year I inquired about the number of the aircraft lines, and you note in your statement that you have not reduced the number of aircraft lines as previously indicated to the 14, as I understand. That was the response I believe a year ago.

And could you tell us, over the next 5 years, what will be closed and give us some idea of when and whether you have the intention of opening additional lines?

Admiral **Busey**. Yes, sir; I have the details here in front of me.

Senator **Kennedy**. If you could just give sort of a brief overview of it.

Admiral **Busey**. The AH-1T line, for instance, planning that the buy of 22 that we requested for this year will complete that requirement, so that line will go away from 1987, fiscal year 1987 and out.

The SH-2F helicopter, fiscal year 1986 is our planned last year of buy there, so that line will go out of service from fiscal year 1987 and out.

The F-16 Adversary buy, we are asking for 12 aircraft in 1986 to go with the 14 that we have under procurement now, so that line at General Dynamics will go away fiscal year 1987 and out.

And that is how we move then toward the 11 lines that we are presently forecasting.

Senator **Kennedy**. What about the new lines?

Admiral **Busey**. Well, there are pluses and minuses in there. Of course, we have presently planned to bring the E-6 aircraft on line at Boeing for a short period of time, so that will come on.

Senator **Kennedy**. My time is up, Admiral, but I would like to have that for the record, and I have just a final question on the F-404 engine, and I understand you are developing a second source, and I would be interested in those procedures that are being followed in terms of that second source. I have some questions on that, and if you could supply those for the record, I would be very grateful as well.

Chairman **Goldwater**. The record will stay open all day for questions.

Now, I think it is my turn.

Admiral Martin, what is the Navy's current estimate of the cost to rewing the A-6E?

Admiral **Martin**. Mr. Chairman, I will have to submit that for the record, sir.

[The information follows:]

A-6 Rewing Cost

In December 1984, the Navy estimated the cost to contract for 255 existing A-6E wings and install 205 of them through fiscal year 1989 to be $658.6M in then year dollars. Due to the magnitude of the required investment, the Secretary of the Navy decided to compete the procurement of a common wing for production and retrofit A-6E's and production A-6E's through 1991 for a total of 408 wings. The proposed Invitation For Bid (IFB) for this competition limits the total nonrecurring cost in the first three years at $108M. The recurring cost for this new wing will be known when industry bids are opened in mid-May of this year. It is believed that sufficient competitive pressure exists at this time to hold down the recurring wing cost to an affordable level if industry remains convinced that the Navy is committed to this competition.

Chairman **Goldwater**. All right, what is the expected service life of this new wing compared with the service life of the existing wing?

Admiral **Martin**. The anticipated service life of the new wing that will be developed will be 4,400 hours as opposed to the 2,250 hours of the present wing.

Chairman GOLDWATER. What consideration has been given to changing the flight regime of the A-6E in order to minimize wing stress?

Admiral MARTIN. The present aircraft, that have the old wing, we have restricted the flight regime on some of the high time wings. As far as the new wing goes, we anticipate that to still be a high net plus and minus G capable wing, one that will be designed—are you asking, sir, about the new wing or the one that presently is there, and in decreasing the flight regime?

Chairman GOLDWATER. How many G's are you talking about, positive G's and negative?

Admiral MARTIN. I will submit that for the record, sir. I do not have it at the tip of my fingers.

Chairman GOLDWATER. Submit both positive and negative.

[The information follows:]

A-6E G-LIMITS

The normal maneuvering limit for an unrestricted A-6E is 6.5 positive and 2.4 negative Gs. Recent training restrictions were imposed on those unrestricted aircraft to limit the positive Gs to the 4G regime to reduce the rate of wing fatigue expenditure.

Additional G restrictions are placed on A-6E's as determined by their wing fatigue life expended. Seventy (70) aircraft are restricted to 4.5 positive Gs and forty-two (42) aircraft are restricted to 3.0 positive Gs.

Chairman GOLDWATER. If in your opinion either one is sufficient, outline what restrictions you are going to have to put on the aircraft for flight purposes.

ADVANCED TACTICAL AIRCRAFT [ATA]

Now, Admiral, getting into the advanced tactical aircraft, the Navy is considering the development of an advanced tactical aircraft, your ATA, that would be a follow-on to the A-6E.

What are the justifications for the ATA, is that the A-6E will not be survivable in the threat environment projected for the late 1990's and beyond. One of the deficiencies of the A-6E supposedly is that it is a subsonic aircraft.

Now, the question: Will the ATA be a subsonic aircraft also, or will it have a supersonic capability?

Admiral MARTIN. Mr. Chairman, the ATA presently is in conceptual development; we're trying to determine precisely what is wanted in the ATA, and I think considerable study will have to be made before any determination can be made as to whether the ATA should be or will be supersonic or subsonic, and I don't think we are prepared to answer that, whether it should be or should not be, until considerable study is completed.

Chairman GOLDWATER. What is your personal feeling? Do you need a supersonic aircraft, or will subsonic do?

Admiral MARTIN. I do not have a personal feeling on it, sir, because I have not studied it sufficiently. I want to keep an open mind on the development of the ATA completely.

Chairman GOLDWATER. Well, I think you had better come up with an idea pretty soon. We are talking about an advanced tactical aircraft. I think one of the first things you want to know is what you want it to do.

Admiral MARTIN. Well, indeed, sir, but how it does that and at what speed it does it, I would still rather have the opportunity to completely study that program.

Chairman GOLDWATER. OK. I am just kind of prodding you along.

You don't know, then, the Navy's projected cost to develop the ATA?

Admiral MARTIN. No, sir. I do not think those figures have been derived as yet.

Chairman GOLDWATER. Well, let's get along with it. I think we ought to know those things.

AMRAAM

Now, getting over to AMRAAM, what are the Navy's intentions regarding the procurement of the advanced medium range air-to-air missile, AMRAAM?

Admiral MARTIN. The Navy supports the development and procurement of the AMRAAM, sir, which is an Air Force program. The Navy has a need for that weapon and supports that program.

Chairman GOLDWATER. Do you have any plans as to how to equip the Navy aircraft with a beyond-visual-range BVR in the event AMRAAM is terminated?

Admiral MARTIN. Well, of course, the Navy does have the Phoenix, the AIM-54C, which is certainly beyond visual range and a very capable system, and that is not the only one that we have at this time.

We have the Sparrow, the AIM-7 missile, which is a medium range missile, beyond visual range also.

Chairman GOLDWATER. Well, we are hoping, of course, we can get AMRAAM back on track, but I think it is going to be through the efforts of the manufacturer and not through the efforts of the Congress.

Admiral MARTIN. I would like to correct my statement a moment ago. The AMRAAM is a joint program.

Chairman GOLDWATER. Yes, that's right.

INTEROPERABILITY OF COMMUNICATIONS

Admiral, the issue of interoperability of communications equipment among the various services has been a matter of considerable concern for this committee.

How will the Navy and the Air Force ensure the interoperability of the JTIDS system, both voice and data, and how will the Navy communicate with the Air Force advanced communications system, or the EJS?

Admiral MARTIN. First, I share with you the concerns on interoperability, and one of the things that I have personally done in the Sixth Fleet was to take every step possible to enhance our interoperability, and I think we have made giant strides in that regard.

The Navy, of course, supports the JTIDS Program, and I feel that it is very necessary that we take every step possible to improve interoperability, not only with the Air Force but the other services and our allies, as the case may warrant.

Chairman GOLDWATER. I don't think you have this, but could you supply the additional costs that you and your team feel are required to achieve the interoperability?

Admiral MARTIN. I do not have that, sir, and actually, the communications aspects do not fall under my purview, but I will see what can be done to determine that interoperability, because I think you have to fence the degree of interoperability we are talking about, and I am not certain that we are prepared to do that, but I will find out, sir.

Chairman Goldwater; I hope you will, and I think you should make it part of your responsibility.

[The information follows:]

JTIDS COMMUNICATIONS INTEROPERABILITY

Navy compatibility and interoperability with other Services on Joint Tactical Information Distribution System (JTIDS) is assured by compliance with Department of Defense (DoD) direction to implement a common waveform, frequency and message standard (Tactical Digital Information Link-J, TADIL J) for JTIDS.

The Air Force Enhanced JTIDS System (EJS) development, although targeted primarily for another frequency band, will also have a capability on the common frequency and common waveform. This ensures interoperability.

DoD efforts to ensure compatibility and interoperability among jam resistant communications equipment were outlined in a paper forwarded to the Congress on 28 March 1984 in response to similar questions asked at an 1985 House Armed Services Committee (HASC) R&D subcommittee hearing. In response to 1985 Authorization Conference language the DoD submitted a report to the House and Senate, Committees on Armed Services dated March 1, 1985, which addressed the communications jamming threat to tactical aviation units and the cost-effectiveness of the overall tactical anti-jam communications program. This report reiterates that Navy and other services will be interoperable.

No additional Navy costs above those needed to execute the programs contained in the budget are needed to ensure interoperability. The architecture being developed will ensure necessary interoperability.

Chairman GOLDWATER. One of the biggest problems we have, honestly, is the communication problems between the services. It is hard to believe that after all the years of communications experience that you have had and we have had and all of the services have had, that the Navy and the Air Force have a hard time talking to each other. The Air Force and the ground have a hard time talking to each other. I cannot as a lifetime communicator understand why the services can't talk to each other. I have a little box behind my desk that cost about $200 that I can pick up and talk to Los Angeles any time I want, I don't know, something is wrong someplace, and it is badly wrong.

But you are going to hear more of this.

FLYING HOURS

Now, before I get through with my questioning, I had one specific question. You got into the subject of flying hours, but you didn't mention the number of hours, how many hours are your pilots getting now?

Admiral MARTIN. We are presently funding the flying hour program in the U.S. Navy at 87 percent of the primary mission readiness. Primary mission readiness is the percentage of the total number of hours required to be mission ready in any given aircraft as defined by a rather complex formula. We are funding to 87 percent of that. The deployed squadrons are funded to about 110 percent in the 6th Fleet. I think it is 115 percent in the Pacific Fleet. What this boils down to——

Chairman **Goldwater**. I am talking about hours.

Admiral **Martin**. This boils down, sir, to approximately 25 hours per air crew per month.

Chairman **Goldwater**. Well, that is very good. I hope you can do it. We don't pay enough attention to the flying hours required by all of our pilots to remain proficient, and you gentlemen who are pilots know that.

Admiral **Martin**. I agree, sir. This relates directly to safety and the saving of aircraft.

Chairman **Goldwater**. Now, one question and then I will get off your back.

F-18 PROBLEMS

Last year you had trouble with the F-18 caused by a flutter of the parts, caused by, I believe, the wing root, and I remember the first flight I had in an F-18, in a simulated high angle of attack climb, I got that flutter, and I asked the IP what was going on. Well, he said, that's just prestall. And I said to myself, that's quite a prestall indignation.

And in those days you punched a black button and the computer got you out. But that is no way to do it.

Are you satisfied that the kits that have been provided by the manufacturer have solved this flutter problem?

Admiral **Busey**. Yes, sir; we are, and the manufacturer, as you know, McDonnell-Douglas, has stood up to this. They have incurred the expense of fixing all of our aircraft themselves, and we have the fix on the first aircraft that are deployed now, and the retrofit fix is moving along very rapidly, and we are quite confident that the cleated bracket fix on the F-18 tail structure will give us in fact the 6000 hours of service life that we have expected, and we intend to test, fatigue test the aircraft to ensure that that happens. But we are satisfied.

Chairman **Goldwater**. John, do you have any questions?

Senator **Warner**. Thank you, Mr. Chairman.

INTEROPERABILITY

Mr. Chairman, first I join with you in the question of interoperability issue, and I dare say that one of the hallmarks of your tenure here as chairman will be the resolution of that problem.

Chairman **Goldwater**. I hope.

Senator **Warner**. Which brings me, Admiral Martin, to my first question. The Navy has embarked upon a program to achieve commonality in avionics and electronics with the four tactical aircraft programs, AV-8, F/A-18, A-6E and F-14.

Could you comment on that?

Admiral **Martin**. May I defer to Admiral Busey on that?

Senator **Warner**. By the way, Admiral Martin, it is good to see you again. We last were aboard the *New Jersey* when Senator Tower and I went to Beirut.

Admiral **Martin**. Yes, sir, it is good to see you.

Admiral **Busey**. The objective we are striving to achieve in commonality in the avionics equipment among the four aircraft that you mentioned, Senator, is 80 percent. This will do a lot of things for us. It will enable us to reduce the numbers of test equipment we buy which are peculiar to each type of aircraft. It will reduce the maintenance requirements aboard our aircraft carriers, reduce the spares pipeline.

Senator **Warner**. That is all obvious.

So you say you are 80 percent along in that program?

Admiral **Busey**. Eighty percent commonality at the weapons replaceable assembly level is our objective, and we feel confident that we will achieve that commonality.

Senator **Warner**. Well, now, that is being done with new aircraft being manufactured, and when they are sent back for their——

Admiral **Busey**. Well, the new production F/A-18's and AV-8B's have new avionics now.

Senator **Warner**. Which is or is not interoperable?

Admiral **Busey**. It is interoperable. The displays are interchangeable, radio equipment, navigation equipment, the inertial navigation.

Senator **Warner**. So the new production aircraft are coming on interoperable?

Admiral **Busey**. On those two aircraft, and we intend to enforce that into the F-14D and the A-6E upgrade. The same avionics equipment will be forced into those upgraded aircraft. So we will have that commonality amongst those four birds.

Senator **Warner**. But I am trying to determine at what stage an aircraft which is operational today receives that upgrade. Is it when it goes back for what we call its PAR?

Admiral **Busey**. All of the production F/A-18's and AV-8B's have electronic commonality. They will not have to be backfitted. The new production F-14D which will go into production in the 1988 timeframe, and the A-6E upgrade which will also go into production in the 1988 timeframe and are in the full scale development mode now, those capabilities are being designed into those aircraft and will be in the production aircraft.

Senator **Warner**. But I would turn to existing aircraft that are operational today.

Admiral **Busey**. There is no retrofit now planned.

Senator **Warner**. The program does not provide retrofit for the existing A-6 and F-14 fleets.

Admiral **Busey**. That is correct. However, we are attempting to achieve commonality with in production aircraft by upgrading them on an individual basis with radio equipment, for example, with inertial navigation systems, with the standardized instrumentation.

Senator **Warner**. Well, I think you have answered the question. You have determined that you will not try and go back to retrofit existing aircraft.

Admiral **Busey**. Engines are another area, Senator, that we are achieving commonality.

Senator **Warner**. I understand that.

JVX

Now, General Smith, on the questions of the JVX, the Army recently indicated that they would not consider a tilt rotor for their LHX, but I understand you are interested in that.

General SMITH. That is absolutely correct, Senator. We are interested in it for two reasons, primarily. One is it gives us the speed, and it gives us the range and fuel efficiency that we need.

Now, I would hesitate to comment on the Army's plans concerning tilt rotor.

Senator WARNER. Well, that is being a good Marine not to criticize. There must be some reason however that two services are looking at this conceptual aircraft, and would have a different viewpoint of that major feature. It would seem to me that there would be a good deal of commonality in the mission of the two services for that aircraft.

General SMITH. It certainly has that potential, Senator.

Senator WARNER. The mission, you think——

General SMITH. The missionization, so to speak, is considerably different. They are looking at a smaller vehicle, considerably smaller than ours, and the range is going to be considerably different also. They are examining, for instance, the utilization of a single pilot which has nothing to do with the tilt rotor technology because the tilt rotor is easier to fly than the conventional helicopter configuration we see today.

Senator WARNER. Well, I will take a look at the situation then. Thank you, Mr. Chairman.

Chairman GOLDWATER. Senator Hart, do you have any questions?

Senator HART. Mr. Chairman, I would just like to provide three or four questions for written response, if I may.

Chairman GOLDWATER. Senator Bingaman, do you have any questions?

Senator BINGAMAN. I just had a couple, Mr. Chairman.

PRODUCTION LINE REDUCTION

Let me ask in response to or in reference to your answer when Senator Kennedy was asking about the number of production lines, I am sure that the intention to reduce to 11 production lines in 1988 is well grounded and all, but I am concerned I guess, after being here 2 years, that it is easier to plan to eliminate production lines than it is to get them eliminated.

What would your reaction be to some direction from this committee or from the Congress that you do in fact reduce the number of production lines next year by a certain number or come up with no more than 14 production lines or something consistent with your plans so that you would have an additional basis for justifying that action?

Admiral MARTIN. Well, Senator, production lines that are planned to be closed remained open because of requirements, either the numbers of aircraft were not procured or other possible requirements.

I would be opposed to direction to cut or reduce production lines simply to reduce production lines without considering the requirements involved. I would think that the production lines that have remained open have done so for very real and good reasons and so to answer your question specifically, I would not like to see closures mandated.

ADVANCED TACTICAL AIRCRAFT

Senator **Bingaman**. Let me ask about—you said you were going to keep an open mind on the advanced tactical aircraft. Since I am coming at this with a very open mind, why do we need an advanced tactical aircraft in the Navy as well as in the Air Force?

Admiral **Martin**. The advanced tactical aircraft the Navy would like to have is to replace the A-6F in the late 1990s in order to keep up with the modern technology that is available and also to counter the projected threats.

Now, I will provide anything that we have on this for the record, if I may, sir. As I am relatively new here, I am not up to speed on the advanced technology aircraft plan and procurement yet.

Senator **Bingaman**. I would be anxious to get any response you have as to why the Air Force advanced tactical aircraft would not be sufficient for your purposes. I don't know the differences in the planning on the two, and maybe that is something that is very clear to everybody else in the room, but it isn't to me.

Admiral **Moranville**. I am Admiral Moranville, and I work for Admiral Martin, and I am involved in the development of the ATA, and the missions are clearly different, for starters. The Air Force's initial thrust for development of the advanced tactical fighter is a fighter. The Navy's airplane will be an attack airplane.

Now, we hope there is going to be a lot of commonality in systems between the airplanes, and I am the head of the Navy side of the committee, a joint committee of the Air Force and Navy, which is looking at all of the systems that go in these airplanes to make sure that if we can have the same system, we will. But you have to understand that some of the systems in a fighter will be clearly different. If you develop an airplane to go at low level and go a long way, it will be very difficult for that engine to take it at Mach 2.5 at 50,000 or 60,000 or 70,000 feet. The same engine won't do well for both missions. So there are going to be differences in the two aircraft, but we will have maximum commonality in the electronic systems and wherever else we can.

Senator **Bingaman**. Well, let me just ask about one other item, Mr. Chairman.

MARK XV ID SYSTEM

I gather we are going to have a special hearing perhaps on this ID system, this combat ID system that we discussed a little bit in the Army hearing the other day, this friend or foe Mark XV system, and I gathered from what we heard the other day that this has been something of a disaster trying to get this thing to work the way people had hoped.

Could you comment on that in your experience?

Chairman **Goldwater**. This is the problem that we are having with the Germans.

Admiral **Martin**. I will provide an answer to that question for the record, sir.

[The information follows:]

MARK XV COMBAT ID SYSTEM

The Mark XV Combat ID System is a tri-service program managed by the Air Force under a tri-service Memorandum of Agreement. The system is being developed as a standard system to replace the older Mark XII IFF system. The Mark XV will be form, fit, function and plug compatible (background compatible) with the Mark XII system currently installed in all U.S. forces.

NATO does not presently have a standard secure identification system and the Mark XV is the U.S. candidate for the future NATO ID system. The Federal Republic of Germany is proposing another system that operates in a different frequency band and would not be compatible with the Mark XV nor the Mark XII systems. In response to the Federal Republic of Germany and United Kingdom concerns that the Mark XV system will interfere with air traffic control frequencies, the U.S. has proposed adding a radar mode to the Mark XV system to reduce the probability of interference.

Senator **BINGAMAN**. That's all I have, Mr. Chairman.

Chairman **GOLDWATER**. Are there other questions from other members of the committee? And if not, I don't want you to get away. We have just a few matters of committee business to take care of.

[Questions to be answered for the hearing record follow:]

QUESTIONS SUBMITTED BY SENATOR STROM THURMOND

NUMBER OF A-6E'S IN THE BUDGET

Senator **THURMOND**. Admiral Martin, there is a request for six A-6E Intruder aircraft in the budget.

Is this necessary in view of newer aircraft being purchased, and is this a cost effective purchase?

Admiral **MARTIN**. The A-6E is the Navy's only all-weather attack aircraft. It is the only tactical carrier based aircraft in inventory that can project sea-based air power out to the longer ranges needed for a full air strike capability in adverse weather conditions. More than six new A-6's are needed in fiscal year 1986 to achieve out year force structure goals but at least six are required to replace attrition losses and maintain the minimum acceptable inventory of this very important aircraft.

AIRCRAFT TYPE PRIORITY

Senator **THURMOND**. Which is a higher priority for the Navy, the A-6E or the F/A-18?

Admiral **MARTIN**. Both aircraft are of equal priority because they perform different missions. The Navy needs both to be effective. The A-6 provides long range power projection in all-weather conditions while the F/A-18 is a medium range strike fighter with limited all weather capabilities. Loss of either one would compromise the Navy's ability to counter the threat.

AIRCRAFT CAPABILITIES

Senator **THURMOND**. Which is a more capable aircraft?

Admiral **MARTIN**. Both are very capable performing their own specified missions. The combat environment that they were optimized for is different. One is a high payload, long range, all-weather attack airplane, and the other is a medium range strike fighter with limited all weather capabilities. Both capabilities are required to counter the threat.

QUESTIONS SUBMITTED BY SENATOR JOHN WARNER

F-14

Senator **WARNER**. Admiral Martin, I note that the Navy plans to procure F-14A's with TF-30 Pratt-Whitney engines through fiscal year 1986. The F-14D upgrade program includes the replacement of this engine with the F-110 General Electric engine. Are there incentives in the contract with General Electric for delivering earlier?

Admiral **Martin**. There are currently no incentives in the USAF contract for early delivery of the Navy version of the F-110 engine. The earliest delivery date of the Navy F-110 engine is August 1987.

Senator **Warner**. What about the Grumman contract for F-14D upgrade?

Admiral **Martin**. The Grumman F-14D Full Scale Development contract provides for the development, integration and test of the F-110 engine in the F-14. There are currently no incentives in the Grumman subcontract with General Electric to accelerate the test and integration program.

Senator **Warner**. Wouldn't there be a substantial cost savings if we could upgrade the F-14s early and not have to procure F-14As in the current (less capable) configuration?

Admiral **Martin**. There is no feasible way to upgrade the F-14s earlier than according to the current schedule. The development of the F-14D is a low risk, highly concurrent Navy program to initiate production in fiscal year 1988. The Navy version of the F-110 engine will be developed in time to be installed in the last fiscal year 1986 production F-14.

PILOT RETENTION

Senator **Warner**. Admiral Martin, according to a Defense Week article (Feb. 19) there has been a dramatic increase in Naval Aviator resignations during the current fiscal year.

In fact, the number of resignations has been 3 times the number who resigned during the same period in fiscal year 1984.

Secretary Lehman's report on the fiscal year 1986 Military Posture of the Navy and Marine Corps submitted on 6 February indicated that the Aviation Officer Career Pay (AOCP) has been dramatically successful and that retention of Naval Aviators had more than doubled in the last four years of paying AOCP.

Would you please clarify what the present Navy pilot retention situation is and how this will effect the Navy's readiness level?

Admiral **Martin**. AOCP has been dramatically successful in retaining experienced aviators. In fiscal year 1980, prior to implementation of the aviator bonus, retention was at a low of 30% with a shortfall of 2,332 pilots. By fiscal year 1983, retention had almost doubled to 58% and end fiscal year 1984 saw the deficit reduced to 995 pilots. Furthermore, Navy enjoyed the lowest separation rate of pilots in the past decade with the loss of only 276 pilots in fiscal year 1984 compared to annual losses of almost 1,000 in fiscal year 1978 and 1979. Unfortunately, Navy pilot retention is expected to decline to 53% in fiscal year 1985 with an anticipated loss of 520 pilots. This decline is due to the much improved economy and the large demand for pilots by the airlines. Despite this higher loss rate, squadron readiness levels will not suffer. The shortfalls are being seen primarily in the shore duty establishment where Naval Flight Officers are picking up much of the load. While aviation officer retention has improved dramatically since implementation of AOCP, we have seen a significant decline in the pulling power of the bonus in recent months. The incentive pay restrictions applied to the bonus serve to greatly decrease its overall value. For example, a $6,000 a year contract (four or six years) is reduced to only $3,672 a year after the tax deductions ($1,200) and Aviation Career Incentive Pay (ACIP) reductions ($1,128/year). If the aviator is also entitled to Hazardous Duty Incentive Pay (HDIP=$110/mo.), the value of the bonus is further reduced to $2,352 a year. To address this problem Navy has acted decisively by applying a lump-sum payment alternative to carrier-based pilots in fiscal year 1985 with the remainder of eligible aviators in the seabased communities being able to participate at the anniversary payment rate. Additionally, we are submitting an AOCP legislative package designed to increase the value of a six-year contract from $6,000 per year to $8,000 per year, expand the eligibility window by one year for a six-year contract and lift the restrictions on ACIP and HDIP. Continuation of AOCP with these legislative modifications is essential to stemming the loss of experienced Naval Aviators and avoiding the readiness problems we experienced in the past.

AIRCRAFT AGING

Senator **Warner**. You mentioned in your statement that the average age of our aircraft has increased from 8.3 years to 12.4 years today. Have you made any assessment of relationship between aircraft aging and the adverse effects on readiness levels and costs?

Admiral **Martin**. The relationship between the aging process of an aircraft and its readiness levels and maintenance costs is a complex one. As an aircraft progresses through its service life, our demanding operational tempo and harsh environment take their toll, as evidenced by gradually increasing rates of system failures. A 1984 study by the Center for Naval Analysis examined the relationship between aircraft age and reliability based on analysis of changes in the rate of failures per flight hour. This study, which examined the history of four specific aircraft to determine the benefits of aircraft modification programs, concluded an aircraft's rate of failures per flight hour increases as the aircraft ages. The following table shows the increase in actual failure rates for each aircraft during a selected seven-year period:

AIRCRAFT FAILURE RATE PER FLIGHT HOUR

	1972	1973	1974	1975	1976	1977	1978
F-4J	1.39	1.44	1.49	1.44	1.52	1.57	1.52
RF-4B	1.42	1.45	1.50	1.62	2.05	2.18	2.90
A-6E	1.03	1.11	1.13	1.19	1.24	1.31	1.36
CH-46D	0.80	0.84	0.86	1.03	0.92	0.97	1.30

While the rate of failure is only one aspect of readiness, it does indicate the increase in level of effort required to maintain the operational readiness of an aircraft as it ages. Maintenance costs also increase both in terms of increased number of repair actions and in outlays for modifications to enhance readiness or capability.

QUESTIONS SUPPLIED BY SENATOR JEREMIAH DENTON

AIRCRAFT PROCUREMENT

Senator **Denton**. Admiral Martin, the Congress is making a lot of noise about how the Department of Defense wastes money. I believe that many of the things that Congress does require the Department to waste money, for example requiring the services to buy things, like airplanes, that they neither need or want.

Have you encountered anything like that, and are there any items in your current request that are motivated by Congress rather than by the real needs of the Naval Air arm?

Admiral **Martin**. The Congress has, on occasion, directed Navy to procure items not requested in the President's budget. For example, in fiscal year 1985, the Congress directed we buy 24 versus 18 SH-60B LAMPS MK III helicopters. Those additional assets were welcomed by Navy to satisfy documented requirements.

The fiscal year 1986 Budget request represents a balanced and affordable approach to documented requirements and is not the result of Congressional directives.

OPERATIONAL TARGET (OPTAR) FUNDS

Senator **Denton**. Admiral Martin, you will recall, as I do, some of the practices with OPTAR funds that we used to encounter because of the pressure to spend the remaining portion of a unit's allotment before the end of a quarter, or lose that portion. You have just come from operational command and perhaps you can, from that perspective as well as in your current capacity, tell me what procedures now exist to minimize the wasteful use of OPTAR funds.

Admiral **Martin**. Proper utilization of all funding is emphasized throughout the Navy from the CNO staff in Washington, DC to each ship or station. The control of OPTAR funding is managed at the CINC level. The Fleet Commanders-in-Chief (CINCs) effectively use the latest computer hardware and software programs that have been developed to generate and match real time operational and training requirements with OPTAR resource allocation for aviation units. Navy planners use these models to distribute funds based on a unit's deployment and training status. Deployed units, and those in the predeployment training cycle, receive the highest priority in OPTAR allocation. Units that have recently returned from deployments, and those that are shorebased, receive a lower level of OPTAR funding.

The use of computers by the CINC's staffs has afforded greater latitude in the scrutiny and monthly analysis of OPTAR utilization. Squadrons that are unable to execute their projected monthly flying hour program have their funds reduced. These funds are redistributed to units that have the capability and need to increase air crew and unit readiness. This tailored distribution and close scrutiny of unit OPTAR spending at the CINC level improves control and accountability through all levels of command. Our goal is to obtain optimal benefit from every dollar allocated for air crew training and readiness.

Questions Submitted by Senator Gary Hart

AV-8B

Senator **Hart**. In view of the increasing use of Harriers from amphibious assault ships for air defense, does the Marine Corps not require some AV-8Bs optimized for air intercepts.

Admiral **Martin**. Although we are not opposed to the concept of a radar equipped VSTOL aircraft to help defend the amphibious task force, there are drawbacks in using the AV-8B. First, the radar system would add approximately 400 pounds to the weight of the aircraft, seriously reducing its VSTOL capability. To offset the weight penalty other systems might have to be removed, preventing the aircraft from performing its primary mission of close air support. With only a limited number of AV-8Bs embarked in the amphibious task force, the close air support capability of the Marine Corps would be greatly reduced. Second, the cost associated with modifying and maintaining several AV-8Bs with radars would be very high.

Senator **Hart**. Is Spain not planning to buy what amounts to AV-8B+s—AV-8Bs equipped with a modified F-16 air-to-air radar? Would the Spanish aircraft be suitable for use by the Marine Corps in the air intercept role?

Admiral **Martin**. The Spanish Navy has indicated some interest in a radar equipped AV-8; however, current contract negotiations indicate that the Spanish government will purchase the AV-8B equipped for the ground attack mission vice an air intercept role.

DECEMBER 4, 1983, LEBANON AIRSTRIKE

Senator **Hart**. Why did the Navy lose two aircraft in Lebanon, with the third severely damaged, when the Israelis rarely lose aircraft in Lebanon?

Admiral **Martin**. The 4 December 1983 airstrike was well-planned and executed. Planning was thorough and aircrews demonstrated exceptional discipline and training in addition to courage and flexibility.

Target intelligence was good; [deleted].

Comparing U.S. and Israeli tactics may lead to inaccurate conclusions. [Deleted.] The U.S. Navy strike was a quick reaction strike against field-deployed Syrian units in a fluid deployment. [Deleted.]

Senator **Hart**. To what degree did lack of up-to-date countermeasures, including CHAFF and IR deception devices, contribute to these losses?

Admiral **Martin**. There was no lack of up-to-date counter-measures on strike aircraft, and thus this was not a contributing factor. [Deleted.]

Senator **Hart**. By when will the Navy have up-to-date CHAFF and infrared countermeasures dispensers on all its tactical aircraft?

Admiral **Martin**. All Navy tactical aircraft are equipped today with up-to-date CHAFF and infrared countermeasures dispensers.

Questions Submitted by Senator Edward M. Kennedy

NAVY AIRCRAFT AGE

Senator **Kennedy**. Admiral Martin, you state in your testimony, page 3, that the Navy is "losing ground" in its battle to hold down the average age of its aircraft inventory. You note that the average age today of the inventory is 12.6 years, that two-thirds of the inventory is ten years old or greater.

What is the average age of our combat aircraft, excluding airlift, trainers and other aircraft?

Admiral **Martin**. The average age of Navy combat aircraft is 12.5 years.

Senator **Kennedy**. Does the Navy have a goal for average age for its aircraft inventory, and especially for combat aircraft? What is that goal?

Admiral **Martin**. Yes, the Navy's age goal for combat aircraft is 8 to 9 years. This is slightly less than one-half of the aircraft projected service life.

Senator KENNEDY. You indicate that your procurement request of 322 aircraft will reverse the age trend. I note that 241 of the 322 are combat aircraft and the rest are trainers and airlift aircraft. Are 241 combat aircraft sufficient to reverse the age trend in the Navy combat inventory?

Admiral MARTIN. No, approximately 247 combat aircraft would be necessary to start a reversal in the aircraft age.

Senator KENNEDY. If your current 5-year plan for Navy aviation is enacted, what will be the average age in 1992; when the aircraft in 1990 are delivered?

Admiral MARTIN. The current 5-year plan should result in a combat aircraft average age of 13.2 years in 1992.

COMPETITION IN PROCUREMENT

Senator KENNEDY. Admiral Martin, in your statement (page 5) you highlight the significant progress that has been made in introducing competition in aircraft procurement. We all applaud that. You indicate that these efforts "are paying impressive dividends", but you indicate only how much more of your procurement is being awarded competitively, not how much we have saved in the process.

How much will the Navy save by competitively awarding 20 percent of the Aviation procurement contracts that you cite in your testimony?

Admiral MARTIN. Savings realized through competition are a function of the market place and the amount of the savings cannot be predicted in advance. Neither the number of competitors nor their business strategy can be predicted prior to the actual competition, which makes quantifying predicted savings impractical.

Senator KENNEDY. Do you have a goal for competitive contracts and how much would you anticipate might be saved through the process?

Admiral MARTIN. The NAVAIR Competitive goal for 1985 is 30 percent. We are unable to quantify predicted savings as explained in my previous answer. However, NAVAIR budgets are based on continuation of favorable aircraft prices realized during recent years. These favorable prices were realized through hard-nose negotiation as well as competition.

NAVAL AIRCRAFT ECONOMIC PRODUCTION RATES

Senator KENNEDY. Last year the Navy ordered 6 EA-6B at an average cost of $64.1 million each. Last year's production rate was below the economic minimum. This year you are ordering 12 of the aircraft, which is the minimum economic rate, at an average of $39 million each. In total this year, we are spending $100 million more on EA-6B aircraft this year, but we are getting 6 more aircraft for it. These six cost only a third as much as the first six. The Navy appears to be paying a real price for inefficiency. How much would the Navy save if it procured aircraft at least at the minimum efficient economic rate?

Admiral MARTIN. The minimum economic rate for the EA-6B is actually 6 aircraft per year, not 12. The EA-6B is therefore being procured in fiscal year 1985 at the minimum economic rate. The fact that only $100 million more in fiscal year 1986 than was appropriated in fiscal year 1985 will buy twice as many aircraft is explained mainly by the reduced level of support equipment being procured in fiscal year 1986 ($−76.6M). An analysis of flyaway costs in fiscal year 1986 vice fiscal year 1985 reveals that the impact of going from 6 to 12 aircraft is less dramatic than the $100 million figure would suggest. Total flyaway costs increased $159.5 million and unit flyaway costs declined $4.4 million from $35.3 million in fiscal year 1985 to $30.9 million in fiscal year 1986. Of this $4.4 million unit decrease, $3.9 million is attributable to a quantity reduction. Other factors are lower ALQ-99 pods requirements ($−2.5M), configuration changes (+.4M), and escalation ($+1.6M). By comparison to support unit costs which declined by $20.8 million, flyaway costs decreased only $.4 million. The relatively small reduction in unit flyaway costs indicates that although there are savings to be achieved by going from 6 to 12 aircraft, the production rate of 6 aircraft per year is still within an economic range.

The following chart compares production quantities for fiscal year 1986 aircraft requested in the 1986 congressional submission, to minimum economic production rates:

Aircraft	Minimum economic rate	Fiscal year 1986 procurement qty	Delta
A-6E	12	6	−6
EA-6B	6	12	+6
AV-8B	36	46	+10
F-14A	12	18	+6
F/A-18A	84	84	0
CH-53E	12	14	+2
AH-1T	60	22	−38
SH-60B	24	18	−6
P-3C	16	9	−7
E-2C	6	6	0
SH-2F	6	6	0
C-2A	8	8	0

Four aircraft are being procured at rates lower than the minimum economic level. If production of these aircraft were raised to the minimum rate, the following recurring unit flyaway costs would result:

[In millions of dollars]

Aircraft	Minimum economic rate	Current fiscal year 1986 rate	Recurring unit cost Delta
A-6E	19.4	21.7	−2.3
AH-1T	6.7	6.9	−.2
SH-60B	12.9	14.0	−1.1
P-3C	31.1	36.2	−5.1

NAVAL AIRCRAFT ECONOMIC PRODUCTION RATES

Senator **Kennedy**. If the Navy were buying all aircraft at the production rate projected at the end of the 5-year plan, which we never achieve, how much lower would be the average flyaway cost of aircraft?

Admiral **Martin**. Except for the A-6E, F-14A, and F/A-18A all naval aircraft are being procured at the same or a lesser rate in fiscal year 1990 (year of reference) or are not being procured at all. The following recurring unit flyaway costs provide comparative prices.

Aircraft	Fiscal year 1990 quantity	Unit if procured in fiscal year 1986 (Millions)	1986 congressional		Difference	
			fiscal year 1986 Quantity	Unit (Millions)	Quantity	Unit (Millions)
A-6E	12	$19.4	6	$21.7	+6	−$2.3
F-14A	24	32.7	18	34.3	+6	−1.6
F/A-18A	146	20.3	84	21.2	+62	−9

PRODUCTION LINES AND PRODUCTION EFFICIENCY

Senator **Kennedy**. For 4 years we have stretched out the production rate on the F/A-18. Last year the Navy sacrificed the production increase on the F/A-18 when the May budget revision was submitted. You have a production increase built into your five year plans for the F/A-18, but we are likely to have to cut the budget again this year. Is the Navy again going to stretchout the F/A-18 if reductions have to be made in Navy aviation accounts?

Admiral **Martin**. The Navy may again have to rebalance the budget due to affordability. If a significant reduction occurs in Navy aviation accounts a stretchout of the F/A-18 procurement would probably result. However, the Navy is committed to ramping up the current rate if affordability permits.

COMMONALITY IN AVIONICS

Senator **Kennedy**. Secretary Lehman in his posture statement indicated that it is the Navy's policy to achieve 90 percent commonality in avionics and electronics for the AV-8B, F/A-18, A-6 and F-14. He indicated this would save $4 billion over the rest of the decade.

Have we achieved the 90% commonality target today in these four aircraft? What is the current percentage of the avionics commonality? Please document the savings estimate made by Secretary Lehman.

Admiral **Martin**. Yes, the commonality target has been achieved for the development aircraft. The current percentages of commonality for the A-6F and F-14D exceed 90%. An analysis of the cost savings due to commonality has not been performed so the Secretary's savings estimate cannot be specifically documented, however, the savings from minimizing peculiar test equipment, maintenance requirements and spares will be significant.

Senator **Kennedy**. Is it the Navy's policy to have the Advanced Tactical Aircraft 90% common in electronics with these aircraft? What are your commonality goals for the Advanced Tactical Aircraft? How much do you expect will be the development cost savings by achieving 90% commonality, if that is the Navy's goal and is judged feasible?

Admiral **Martin**. No, it is not the Navy's policy to have the Advanced Tactical Aircraft (ATA) 90% common in electronics with the AV-8B, F/A-18, F-14D or A-6F. The difference in timeframes involved for each aircraft does not make 90% commonality with these aircraft practical or even desirable. The U.S. Air Force's Advanced Tactical Fighter (ATF) has an IOC close to that of the ATA. A joint service agreement has been developed between the Navy and the Air Force to establish commonality wherever practical. Cooperative development of critical technologies, subsystems, and components is expected to reduce overall program costs and enhance interservice commonality. As a result of this memorandum of agreement, an ATA/ATF Commonality Team has been established to review each program and develop a plan that will make the best use of development funds while satisfying the distinct requirements of each service. Because this team has only recently been formed, no commonality goals other than "maximum extent feasible" have been established and hence no savings estimate can be determined.

Senator **Kennedy**. What other commonality goals does the Navy have regarding aircraft mission electronics?

Admiral **Martin**. No other specific commonality goals have been established regarding aircraft mission electronics, however, the Naval Air Systems Command has established a commonality board to emphasize commonality for all naval aircraft. This board will oversee the aircraft programs to ensure that commonality is considered in development programs and maintained for existing aircraft in the fleet. Initially, the board is considering avionics commonality in both hardware and software, with the intent to include commonality in all aircraft subsystems. In addition, a core avionics program exists to develop certain "core" avionics, (e.g., communications, navigation and computer equipment) that are common across all Navy aircraft. Many of the equipments are in the fleet today.

BUDGET REDUCTIONS

Senator **Kennedy**. Painful as they are, budget reductions are inevitable, and some will fall on Naval Aviation. We all know that your production rates are stretched out to the breaking point. You are just now getting your mission capable rates up to the Navy's 70 percent goal and none of us want to reverse that positive trend.

Your sustainability stocks for munitions are too low, in my judgment. The Chief of Naval Operations testified this year that we are continuing to "cross deck" critical munitions, and that cross decking will continue until 1989, and then only if we provide the funds requested in the budget. And you have indicated in your testimony that flying hours are already pinched and really cannot be reduced.

What priorities can you offer to guide our efforts in making budget reductions?

Admiral **Martin**. The Navy's fiscal year 1986 Budget request is designed as a balanced, affordable program, without compromising specific requirements of our readiness, sustainability, modernization and force structure. Reductions to our fiscal year 1986 request will impact adversely the positive trends we have realized in these critical elements of our total combat capability.

JVX/E-6

Senator **Kennedy**. Can we afford to launch new programs—like the JVX or the E-6—in light of the problems that we are facing with efficient production rates? Will not adding new systems—like JVX or the E-6—exacerbate the problem of efficiency, especially if budget reductions must be made?

Admiral **Martin**. New programs are designed to procure aircraft or other weapons systems for which a threat-driven requirement exists. While we attempt to keep the number of production lines to a minimum, and to achieve efficient production rates on extant lines, we place primary emphasis on a balanced, affordable program which responds to the threat.

AIR-TO-AIR MISSILES

Senator **Kennedy**. The Air Force is developing the new Advanced Medium Range Air-to-Air Missile, or AMRAAM. They intend to replace all radar Sparrow AIM-7 missiles in the active fleet with AMRAAM. AMRAAM is having trouble in development and the Secretary of the Air Force has suspended its initial production.

The Navy intends to buy 7,000 AMRAAM missiles. The AMRAAM is designed to do much of what the Phoenix does, but not at the same ranges though at much greater speeds.

[Deleted.] Does the Navy consider AMRAAM just as critical if it costs twice as much as projected?

Admiral **Martin**. We will make our procurement decision after AMRAAM has been fully developed and tested. We are prudently evaluating viable alternatives should AMRAAM become so costly as to prevent procurement of the original quantity. These alternatives include the current AIM-7M Production Improvement Program, which is a low altitude fuze upgrade. Additional AIM-7M improvements are being considered.

Senator **Kennedy**. Would an upgraded version of the AIM-7 Sparrow meet the Navy's need for a beyond visual range missile to complement the Phoenix missile?

Admiral **Martin**. An upgraded version of the AIM-7 would not totally fill the Navy's requirement for a beyond visual range missile to complement the Phoenix. The current upgrade program includes only a fuze upgrade. Additional AIM-7M concepts under consideration are improved aerodynamics, propulsion, seeker technology, and enhanced Electronic Counter Countermeasures (ECCM). These improvements would not be available to meet AMRAAM's IOC [deleted].

Senator **Kennedy**. Admiral, you indicate that Phoenix is so critical to the Navy's defense needs and that the current inventory is so insufficient that you will be developing a second source for the Phoenix missile. Could AMRAAM be a substitute for additional Phoenix missiles?

Admiral **Martin**. No. [Deleted.]

Senator **Kennedy**. Since Hughes is developing AMRAAM and is producing Phoenix, would you want a second source producer in any event?

Admiral **Martin**. The USAF is the lead service and program manager for AMRAAM and currently plans to second source that missile. The Navy intends to second source Phoenix, and intends to second source all new major weapons.

PHOENIX QUALITY PROBLEMS

Senator **Kennedy**. Last year the Navy suspended deliveries of Phoenix missiles from Hughes because of poor manufacturing quality control. I note that you are requesting fewer Phoenix missiles this year than you had projected last year were your requirements for fiscal year 1986. Are the quality control problems behind us at Hughes or are they persisting?

Admiral **Martin**. Hughes Aircraft Company's (HAC) quality assurance management system underwent an extensive review by DOD, with the quality assurance system being completely overhauled. A quality assurance Corrective Action Plan (CAP) was generated by HAC, and approved by DOD. This CAP is being implemented by HAC at no cost to the government, and is being closely monitored by DOD. Acceptance of Phoenix missiles resumed in February 1985 with the delivery of 4 missiles. As a result of the Government's review of the HAC Tuscon manufacturing plant, quality control problems have been resolved.

PHOENIX SECOND SOURCE

Senator **Kennedy**. Are you seeking a second source because of the experience you had with quality control?

Admiral MARTIN. No, the Navy's initiative to second source the Phoenix missile began prior to the discovery of quality problems at HAC Tuscon; however, they did serve to emphasize the importance of establishing a competitive second producer.

PHOENIX AND AMRAAM

Senator KENNEDY. Is this a source of concern over AMRAAM since it is also being developed by Hughes?

Admiral MARTIN. No, it is believed that the quality problems associated with the Phoenix production line have not carried over to the AMRAAM program.

V-22A OSPREY

Senator KENNEDY. The V-22 Osprey, formerly known as JVX, is scheduled for full scale development starting this year. The Navy is requesting $603.7 million for this new start. Since last fall the program has been restructured because of cost growth.

Initially the Navy budgeted $2.4 billion in research and development for JVX. A subsequent revised cost estimate placed development at $3.7 billion. The Secretary of the Navy insisted that the program be capped at $2.4 billion. The Navy claims that the original $2.4 billion estimate was a faulty Army forecast, yet that same estimate is what they have budgeted for procurement costs.

Admiral, I understand that JVX has been restructured this past year because of cost growth. Would you review that for the committee?

Admiral MARTIN. Initial estimates of cost were based on helicopter data. The V-22 is not a helicopter and not a conventional aircraft. It is some of both. We have not been experiencing cost growth, rather changes in cost estimates for development. We feel very confident that the risk in this program is acceptable and that the program changes made to reduce the cost estimate for development did not significantly impact risk. We are working on a contractual document for full scale development that will control cost growth during development.

Senator KENNEDY. What did you give up in order to meet Secretary Lehman's directive to develop V-22 for $2.4 billion?

Admiral MARTIN. We modified internal schedule milestones that allowed the engine used in production to also be used in development. This eliminated use of an interim engine. We reduced the flight test vehicles from seven to six. We recognized cost avoidance from the competitive acquisition of the engine. We took a hard look at planned government effort and the test program and removed redundancies and tasks that had marginal payback.

Senator KENNEDY. Generally when there is cost-growth in research and development on a program there is cost-growth in the procurement of the item. I understand that you are continuing to base the procurement of V-22 on the same estimate that produced the under-funded R&D program. If the procurement cost of JVX increases, 30% consistent with the forecast of increase in development, can the Navy afford to buy JVX in the quantity required?

Admiral MARTIN. The V-22 is requesting permission to transition into full scale engineering development through the Defense System Acquisition Review Council (DSARC) process. Part of that process is a new estimate of production costs and a detailed review of the estimate. The results of that review and a decision on affordability will be available upon completion of the DSARC process.

LOW COST SEEKER

Senator KENNEDY. HARM is the latest generation anti-radiation missile being procured for both the Air Force and the Navy. HARM's costs were extremely high. In order to find an alternative and put pressure on the HARM's manufacturer. Congress launched a program called the "Low Cost Seeker." The Low Cost Seeker program began at the Naval Weapons Center at China Lake, California. They continue to manage the program.

Admiral, the staff informs me that the Air Force believes that the Low Cost Seeker [deleted]. Do you share that assessment?

Admiral MARTIN. Yes, the Low Cost Seeker is scheduled to achieve IOC [deleted].

Senator KENNEDY. How many HARM missiles could be fitted with the Low Cost Seeker under your current plans [deleted].

Admiral MARTIN. If the Low Cost Seeker is available [deleted] units could be fitted [deleted] with initial production units. Current plans indicate a potential for [deleted] units to be fitted in [deleted] subsequent years.

Senator KENNEDY. What value is there in proceeding with the Low Cost Seeker if it is not available until after most HARM missiles are procured?

Admiral **Martin**. The Low Cost Seeker should provide state of the art improvements in reliability and maintainability over the current HARM seeker, and should provide the growth potential to counter the postulated threats of the 1990's. If the design matures as forecast a retrofit effort into the baseline HARM is a possibility. If HARM inventory requirements are increased in response to threats, and/or foreign military sales are expanded [deleted] then the Low Cost Seeker could have a major impact on program costs.

CBO REPORT ON AIRCRAFT PROCUREMENT

Senator **Kennedy**. Admiral Martin, the Congressional Budget Office has released a study which shows that the Navy's aircraft procurement plans are out of balance with its requirements. That analysis shows that the Navy's procurement plans call for 366 too few aircraft in nine lines and 239 more aircraft than required in five other types of aircraft.

The CBO Study claims to be based on Navy data and planning factors. Is this the case, that their data is Navy data?

Admiral **Martin**. The Navy worked closely with the CBO in preparation of their report. CBO's mandate, to keep the report unclassified, precluded use of classified Navy inventory and requirements data; and therefore, CBO analysis, particularly helicopter shortfalls, differs from Navy projections.

Senator **Kennedy**. Is the cause for this mismatch, as claimed in the CBO report, the recent changes the Navy has made in its desired air wing composition?

Admiral **Martin**. No. The change in the air wing composition is a goal which the Navy is working toward. Procurement objectives are in consonance with plans to meet this goal. The Navy does not agree that there is a mismatch. The CBO report is a snapshot in time, 1992, and does not account for economical buy rates, advanced attrition and budgetary constraints. Each year the Navy reviews its plans and procurement objectives and changes are made to meet force level requirements.

CBO STUDY

Senator **Kennedy**. The study shows that the Navy is buying too few A-6's and too many F/A-18's, given the requirements of the new air wing composition. Based on this analysis, why should we not limit the production increases on the F/A-18 and divert those funds to higher rates on the A-6, which is being produced at inefficient rates?

Admiral **Martin**. The Navy's fiscal year 1986 request is a carefully balanced program which specifically addresses affordability without compromising defense requirements.

To produce an unclassified study, CBO utilized only unclassified Navy procurement, retirement, and attrition data. Therefore, CBO analysists were unable, in some cases, to incorporate the most current Navy plans with regard to inventory and force structure requirements. The CBO's analysis is relatively accurate, however, I believe the shortfalls and excesses are overstated.

F/A-18

Senator **Kennedy**. When will work begin on incorporating austere all-weather capability into the F-18?

Admiral **Martin**. Development work begins this year (fiscal year 1985) on incorporation of the austere all-weather capability into all Navy and Marine Corps F/A-18's.

Senator **Kennedy**. When will that capability be available?

Admiral **Martin**. F/A-18 aircraft with the austere all-weather capability begin to deliver in October 1989 (fiscal year 1990).

Senator **Kennedy**. What funding is required to continue this program?

Admiral **Martin**. We are in negotiation with McDonnell Douglas on the F/A-18 Austere All-Weather contract. Although the figures are not finalized, we estimate that we will need an additional $10 million in fiscal year 1986 and $25 in fiscal year 1987. These dollars are contained in our budget request.

MUNITIONS SHORTFALL

Senator **Kennedy**. In your testimony, you indicated that we currently have a significant munitions shortfall, and that under current plans a significant shortfall will continue [deleted] as compared with the planning objective. What is the basis for the munitions requirement as expressed in the planning objective?

Admiral **Martin**. Planning objectives for threat munitions represent the 99 percent probability (or confidence level) that no combatant will run out of ordnance during hostilities. Planning objectives for Level-of-Effort (LOE) munitions represent the inventory of ordnance required for a six month warfighting capability. In recognition of the fact that planning objectives are, in general, long term goals, it is appropriate to also define near term (FYDP) programming objectives, which for threat munitions represent the 90 percent confidence level that no combatant will run out of ordnance and 60 days of warfighting capability in the case of LOE munitions.

PLANNING OBJECTIVE

Senator **Kennedy**. What are the operational consequences of failing to meet the planning objective?

Admiral **Martin**. With an inventory of munitions less than the planning objective, combatants would ultimately face an increased probability of running out of ordnance during hostilities, and as a consequence become less effective. In recognition of the fact that attainment of planning objectives is, in general, a long term goal, the general weapons procurement strategy of the Navy is the allocation of resources, when feasible and consistent with good acquisition practices, toward the attainment of programming objectives during the FYDP funded delivery period. These near term objectives, which represent the 90 percent confidence level and 60 days of warfighting capability for threat and Level-of-Effort (LOE) munitions respectively, are considered to be acceptable minimum inventories which are consistent with current fiscal constraints.

FUNDING REQUIREMENT

Senator **Kennedy**. What funding profile would be required to achieve the planning objective by 1990?

Admiral **Martin**. To achieve the planning objective by the fiscal year 1990 funded delivery period would require major increases over the present production base and consequently estimates of schedule and funding are somewhat uncertain. Based on existing fiscal year 1986 unit procurement costs, the following additional weapons procurement funding over that indicated in the FYDP would be required.

Weapons procurement (WPN) (Quantity/$M constant fiscal year 1986)

Sparrow	[deleted]
Phoenix	[deleted]
Harm	[deleted]
Laser Maverick	[deleted]
IIR Maverick	[deleted]
Hellfire	[deleted]

F/A-18

Senator **Kennedy**. General Smith, what flight restrictions are now being imposed on the F/A-18 as a result of the tail cracks?

General **Smith**. All F/A-18's with cracked vertical tail attaching points have been restricted to subsonic flight and to angles of attack from minus six degrees to a plus 25 degrees. The 11 F/A-18's with broken vertical tail attaching points have been repaired and were returned to flight status. Once repaired, all flight restrictions are lifted.

Senator **Kennedy**. When will they be returned to normal flight operations?

General **Smith**. All F/A-18's which have been delivered to the Department of the Navy are scheduled to be repaired by September 30, 1985. New aircraft deliveries from the contractor will be back on schedule by May 31, 1985.

F404 ENGINE

Senator **Kennedy**. Admiral Martin, would you please describe for us where you are in your plans to introduce a second source for the F404 engine?

Admiral **Martin**. A proposal has been received from Pratt and Whitney (P&W) and is under evaluation by the Navy. We anticipated that an agreement will be reached on appropriate terms and conditions to permit a contract with P&W in the near future. General Electric (GE) has been requested to submit by the end of March, a cost estimate for its support of the technology transfer and substantiation of P&W's processes.

Senator **Kennedy**. When will the second source be in a position to produce the engine?

Admiral **Martin**. P&W plans to deliver their first engine to the Navy for qualification tests in June 1987. The pilot production engines will begin delivery in December 1987.

Senator **Kennedy**. How will the competition be conducted?

Admiral **Martin**. Both sources will be requested to bid on various quantities of engines each year. The production buy will be split between the offerors by the Navy. The relative share of the buy will be determined on the basis of price and other factors to be developed. As long as a need for two sources exists, the Navy will ensure that sufficient orders are placed with the "losing" offeror to permit him to remain competitive the following year.

Senator **Kennedy**. What are the terms of the arrangement for the transfer of the technology to the second source?

Admiral **Martin**. These terms are currently under discussion with both contractors and have not been established.

A-6 UPGRADE ENGINE

Senator **Kennedy**. Has the Navy made a firm decision on what engine it intends to use on the upgraded A-6?

Admiral **Martin**. Yes. The Navy has selected the General Electric F-404 engine.

ADVANCED TACTICAL AIRCRAFT (ATA)

Senator **Kennedy**. What are your projections for total program and unit costs for the Advanced Tactical Aircraft, or ATA?

Admiral **Martin**. During concept formulation we will be determining detailed program costs; however, typically it has taken about four to five billion dollars (fiscal year 1985 R&D dollars) to develop a new aircraft and we do not expect this one to be much different. Procurement unit costs should be in the same ballpark as the F/A-18 and A-6, but this is a function of eventual ATA design, procurement rate, and extent of ATA/ATF subsystem commonality.

Senator **Kennedy**. What is your procurement strategy for ATA?

Admiral **Martin**. The procurement strategy for ATA will be similar to the V-22A or JVX program in that there will be contractor teaming through Full-Scale Engineering Development (FSED). The contractor team competitively selected for the FSED Program will be split for production with each receiving a percentage of the first year production buy. They will then compete for a share of future procurements.

Senator **Kennedy**. Has the Navy considered a flyoff of prototypes?

Admiral **Martin**. No. That procurement strategy is considered too expensive for this program.

F-16 ADVERSARY

Senator **Kennedy**. We are all very impressed with the favorable price the Navy has negotiated for purchasing F-16's as an adversary aircraft. Based on your negotiations, do you see any potential savings for the Air Force in its procurement of F-16's?

Admiral **Martin**. The Navy's F-16 is significantly different from the Air Force F-16C. It has much less sophisticated avionics and no ordinance, pylons, launchers or fuel tanks. These configuration differences and the fierce competition were the major factors contributing to the low price. The Air Force has been fully briefed on all cost factors pertaining to the Navy procurement.

Chairman **Goldwater**. I do want to thank you, members of the Navy and the Marines, for coming over, and I wish both you, Admiral Martin, and General Smith, the best of luck in your new jobs. And the fact that we asked questions that you didn't know the answer to can be attributed to the fact that you have been out doing what you should be doing, and now you can sit over in the Pentagon and relax for a long, long time.

This hearing will adjourn, and we will reconvene for committee business.

[Whereupon, at 11:25 a.m., the committee recessed, to reconvene upon the call of the Chair.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1985

TUESDAY, MARCH 12, 1985

U.S. SENATE,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

AIR FORCE TACTICAL PROGRAMS

The committee met in executive session, pursuant to notice, at 9 a.m., in room SR-222, Russell Senate Office Building, Senator Barry Goldwater (chairman) presiding.

Present: Senators Goldwater, Thurmond, Humphrey, Bingaman, and Glenn.

Staff present: James F. McGovern, staff director and chief counsel; Christine C. Dauth, chief clerk; George K. Johnson, Jr., David S. Lyles, Carl M. Smith, and John J. Hamre, professional staff members; and Inga B. Schoonover, staff assistant.

Also present: Gerald J. Smith, assistant to Senator Goldwater; Les Brownlee, assistant to Senator Warner; Phil Upschulte, assistant to Senator Glenn; Dale F. Gerry, assistant to Senator Cohen; John Roddy, assistant to Senator East; Mark J. Albrecht, assistant to Senator Wilson; Gregory P. Craig, assistant to Senator Kennedy; Edward McGaffigan, assistant to Senator Bingaman; Charles C. Smith, assistant to Senator Dixon; Allan Cameron, assistant to Senator Denton; and John Rasmussen, assistant to Senator Gramm.

OPENING STATEMENT BY SENATOR BARRY GOLDWATER, CHAIRMAN

Chairman GOLDWATER. The meeting will come to order.

This morning the committee meets to receive testimony on the tactical portions of the Air Force's 1986 budget. Here to present that testimony are Dr. Tom Cooper, Assistant Secretary of the Air Force, Research, Development and Logistics; Lt. Gen. Robert Russ, Deputy Chief of Staff, Research, Development and Acquisition; Maj. Gen. Harold Williams, Director of Operational Requirements, Deputy Chief of Staff, Research, Development and Acquisition; and Brig. Gen. Jimmie V. Adams, Special Assistant for Tactical Modernization, Deputy Chief of Staff, Research, Development and Acquisition.

This morning, rather than attempting a detailed review of all the Air Force's tactical programs, I have asked our witnesses to concentrate on certain broad, overarching issues. These include such considerations as force readiness, force composition, and modernization. In addition, I have asked our witnesses to address major controversial programs such as the Advanced Medium Range Air-to-Air Missile, [AMRAAM], the Lantirn Program, the F-15E, and the advanced communications systems.

Gentlemen, it is a pleasure to have you with us this morning.

John, do you have anything you would like to say?

Senator **Glenn**. No, Mr. Chairman. Thank you.

Chairman **Goldwater**. You may proceed any way you care to.

STATEMENT OF HON. THOMAS E. COOPER, ASSISTANT SECRETARY OF THE AIR FORCE FOR RESEARCH, DEVELOPMENT, AND LOGISTICS, ACCOMPANIED BY LT. GEN. ROBERT D. RUSS, U.S. AIR FORCE, DEPUTY CHIEF OF STAFF, RESEARCH, DEVELOPMENT AND ACQUISITION; MAJ. GEN. HAROLD J. M. WILLIAMS, U.S. AIR FORCE, DIRECTOR OF OPERATIONAL REQUIREMENTS, DEPUTY CHIEF OF STAFF, RESEARCH, DEVELOPMENT AND ACQUISITION; BRIG. GEN. JIMMIE V. ADAMS, U.S. AIR FORCE, SPECIAL ASSISTANT FOR TACTICAL MODERNIZATION, DEPUTY CHIEF OF STAFF, RESEARCH, DEVELOPMENT AND ACQUISITION; AND COL. JOHN F. PHILLIPS, U.S. AIR FORCE, DEPUTY DIRECTOR OF LOGISTICS, PLANS AND PROGRAMS, DEPUTY CHIEF OF STAFF OF LOGISTICS AND ENGINEERING, HEADQUARTERS, U.S. AIR FORCE

Dr. **Cooper**. Thank you, Senator Goldwater.

Good morning. It is good to be back, Senator Glenn.

We have an extremely full plate this morning, Mr. Chairman, and I think in the interest of time we will just submit our formal statements for the record.

General Russ and I have a joint statement, and General Hansen would also like to submit a statement for the record.

Chairman **Goldwater**. That will be done.

[The prepared statements of Dr. Cooper, General Russ, and General Hansen follow:]

UNITED STATES AIR FORCE

FY 1986 BUDGET ESTIMATES AIRCRAFT PROCUREMENT, MISSILE PROCUREMENT, AND RESEARCH, DEVELOPMENT, TEST & EVALUATION

JOINT STATEMENT OF

HONORABLE THOMAS E. COOPER
ASSISTANT SECRETARY OF THE AIR FORCE
RESEARCH, DEVELOPMENT & LOGISTICS

LIEUTENANT GENERAL ROBERT D. RUSS
DEPUTY CHIEF OF STAFF
RESEARCH, DEVELOPMENT & ACQUISITION
HQ, UNITED STATES AIR FORCE

PRESENTED TO THE 99TH CONGRESS 1985

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
WASHINGTON, D.C.

Members of Congress

Four years ago the President initiated a carefully planned program to stem the dangerous decade long trend toward Soviet military superiority. The impact that substantial real growth in American military investment has had over the last four years is now evident as combat capabilities have been upgraded, significant progess has been made in weapons modernization and USAF readiness and sustainability rates have been improved. The Fiscal Year 1986 Air Force research, development, procurement and logistics budget request is structured to continue this progress toward restoring the strength of our defense.

We have expanded this year's statement to not only discuss Air Force procurement and research & development budget priorities but also to present our program management improvement initiatives. Taking care of our highly skilled and well trained people continues to be paramount, and our force building priorities remain: to modernize our strategic offensive and defensive forces, to improve the readiness and sustainability of our general purpose forces, to increase airlift capability, to modernize and expand tactical forces and to develop the technology necessary to exploit possible opportunities in space.

For your convenience, we have provided an Executive Summary of this statement. This summary provides a brief overview of the primary threat to our national security and states the basis for the major Air Force research, development, procurement and logistics programs. The main body of this year's statement includes an introduction highlighting major Air Force investment programs and our science and technology efforts. The following sections parallel our budget priorities discussing the major programs within each priority. The final section discusses our acquisition management initiatives which we believe will ensure that we deploy the most cost effective weapon systems possible.

Air Force research, development, procurement and logistics programs represent an investment in both near and far term future military capability. Continued, stable funding, not just for Fiscal Year 1986 but for future years, is necessary to achieve these objectives. Our programs are structured for economy, effectiveness and supportability and are managed by dedicated and innovative professionals.

We seek your support for the Air Force programs requested in the Fiscal Year 1986 budget submittal.

Thomas E Cooper
THOMAS E. COOPER
Assistant Secretary of the Air Force
Research, Development and Logistics

ROBERT D. RUSS, Lt Gen, USAF
Deputy Chief of Staff,
Research, Development and Acquistion

EXECUTIVE SUMMARY

Over the past four years, the President has implemented a bold and decisive plan to arrest the dangerous trend toward Soviet military superiority. The results of the real growth in our military investment during the last four years can be seen in more combat capable military forces, progressively modernized weapons, improved Air Force readiness and sustainability rates. Our Fiscal Year 1986 research, development, procurement and logistics budget request is structured to sustain the progress that we have made and to continue the President's program. The priorities reflected in this budget request, which are consistent with the original program, are: modernize strategic forces, improve combat readiness and sustainability, enhance force projection, modernize and expand our theater forces and exploit possible opportunities in space.

Restoration of the military balance depends heavily on implementation of the plan we began in 1982. The Air Force's Fiscal Year 1986 budget request has been developed on a solid foundation formed by the funding provided by the Congress over the last four years. This request reflects our critical and thorough assessment of required military capabilities, program priorities and resource limitations. It embodies a rational balance among these competing considerations. The Air Force's Fiscal Year 1986 budget request is important to ensure that the course we have set toward an assured deterrent posture can be achieved in the most efficient and cost effective manner.

The Air Force Fiscal Year 1986 budget request represents a deliberate and prudent balance between and within the investment and operating accounts. This budget will give the Air Force combat capabilities with which to respond to current and future military challenges across the full spectrum of conflict. The Air Force's 1986 request provides a balanced capability to maintain security at home and to honor wide-ranging U.S. commitments abroad. At the same time, it provides the proper balance between funding for current readiness and sustainability and investment in the development of future capabilities.

Today's investment in research, development, test and evaluation, procurement and military construction provides tomorrow's force structure capability and growth. In Fiscal Year 1986, about 58 percent of our total request is for investment programs. To maximize return on this investment, the Air Force has taken several management initiatives to enhance program stability, control cost and to revitalize the industrial base. Prudent management of our defense dollars yields not only lower acquisition cost but also lower life cycle cost.

United States technological superiority over the Soviet Union is no longer unchallenged. Through a combination of steadily growing research and development (R&D) investments and covert means, the Soviets have narrowed the gap in technological sophistication. We have today modern and capable systems only because we made prudent investments in our technology base as long as 30 years ago. The capabilities of tomorrow's major weapon systems will be directly traceable to today's investments in science and technology.

Strategic force modernization is our top mission area priority. The credibility of America's deterrent posture depends on Soviet perceptions that we have both capable strategic forces and the national resolve to use them. The existing numerical strategic force balance coupled with the rapid pace of Soviet modernization diminish that credibility. To overcome this, our budget request continues to emphasize the President's program to restore a stable balance of strategic power, send a clear signal of U.S. national resolve and encourage the Soviet Union to meaningfully negotiate verifiable nuclear arms reductions.

ICBM modernization provides a response both to the pace and scope of Soviet ICBM development and deployment and to the significant aging of the current U.S. ICBM force. We are proceeding with the ICBM modernization program recommended by the President's Commission on Strategic Forces and subsequently approved by the Congress. The Commission recommended (1) promptly deploying 100 Peacekeeper missiles in existing Minuteman silos; (2) initiating engineering design of a single warhead ICBM leading to deployment in the early 1990s; and (3) vigorously investigating follow-on basing technologies, including hardened vehicles and silos.

The four stage Peacekeeper missile will be more accurate, carry more warheads, have greater range, and be more resistant to nuclear effects, such as EMP, than current ICBMs. This enhanced capability will begin to offset the Soviet threat to present U.S. ICBM systems and help deter nuclear attacks on the United States and our allies. Full-scale development for basing began in June 1983. Deployment of the first 10 operational Peacekeeper missiles will be achieved by December 1986. Fiscal Year 1986 funding will be used to continue missile production, conduct testing and evaluation and construct support facilities for deployment.

We are also continuing to aggressively develop a Small Intercontinental Ballistic Missile and a hardened mobile transporter. A three phase program strategy is being implemented by the Air Force. The system definition phase, which builds on Peacekeeper technology and assesses alternative technologies, is nearing completion. The pre-full scale development phase began in late 1984 and will continue with competitive contracting for weapon systems integration, for propulsion and for a hard mobile launcher. The full scale development phase for the basing mode or modes will begin in 1987.

The second and most flexible leg of our strategic offensive forces is the manned bomber. The mainstay of the current force is the B-52 strategic bomber, which is now augmented by the FB-111A and will soon be further augmented by the B-1B. Our bombers now have expanded conventional and maritime roles. Two squadrons of B-52 bombers have been modified to carry even larger conventional payloads as well as Harpoon missiles. They now perform sea lane defense, mine laying and sea control/surveillance missions.

The lead component of the President's two bomber program is the B-1B bomber. The first production model was delivered on 4 September 1984, and the first squadron will be operational at Dyess AFB, Texas by September 1986. As a follow-on to the B-1B, the Advanced Technology Bomber will exploit low observable technology to counter expected advances in Soviet defenses.

Due to its critical importance to deterrence, modernization of strategic command, control and communications (C^3) is the President's first strategic modernization priority. Resilient and enduring C^3 links between the National Command Authority and the commanders of strategic forces are vital. Our programs will modernize the Worldwide Military Command and Control System for automated command and support and will develop the Milstar satellite communications system to provide survivable, jam resistant and secure worldwide communications. Other high priority programs are the Ground Wave Emergency Network to provide assured communications between the National Command Authority and U.S. nuclear forces and the Defense Satellite Communications System which provides super high frequency secure voice and high data rate transmissions for defense and diplomatic users.

Strategic defense forces and systems are key elements of our deterrent posture because they provide timely, reliable and unambiguous warning as well as attack assessment. The 1982 comprehensive North American Air Defense Master Plan guides our strategy for modernizing air defense forces. Our aging systems are becoming more expensive and difficult to support. To redress this, we plan to deploy over-the-horizon backscatter radars to provide long range, all altitude, wide area surveillance over the oceans and southern approach areas. To compliment these, we plan to replace the Distant Early Warning radars with a combination of minimally and unattended long-range, all-altitude radars to cover the northern airways. In addition, F-15s and F-16s will be added to our air interceptor forces.

The threat of Soviet missiles, especially sea launched, and space forces continues. Our sea launched ballistic missile warning system (PAVE PAWS) is urgently needed to ensure adequate coverage of longer range multiple reentry vehicles. The SPACETRACK program, which will improve our ability to monitor space activities, is the key to our warning and defensive options. The continued development of an anti-satellite system will ensure our capability to deter threats to U.S. and allied space systems.

The Department of Defense and the Air Force are aggressively pursuing the President's Strategic Defense Initiative (SDI) research program designed to determine if it's technically feasible to develop a defense against ballistic missiles. The Air Force is responsible for about 40 percent of these programs in the 1985-1990 timeframe. Several Air Force programs such as the Advanced Warning System and the Space-Based Surveillance System have now been integrated into the SDI. Experiments and demonstrations will be pursued to assess the feasibility of applicable technologies and to support development decisions in the 1990s.

Space systems have become an integral part of our military forces. They directly support both strategic and conventional forces by providing global data from space for defense missions. Spaceborne surveillance, warning, communications, meteorological and navigation systems significantly increase the effectiveness of our forces today; and we fully expect these spaceborne capabilities to become even more important to our forces in the future. To support our space operations, we require an infrastructure of survivable launch and on-orbit control facilities. Activation of the Vandenberg Air Force Base Space Shuttle launch site, development of the Inertial Upper Stage for payload insertion, modernization of the Satellite Test Center and the Satellite Control Facility, and construction of the Consolidated Space Operations Center will ensure future effective support and control of vital space operations.

Force enhancement is achieved through several programs which exploit space as a medium. The Defense Meteorological Satellite Program is our single most important source of environmental data, and the Navstar Global Positioning System provides a highly accurate three-dimensional radio navigation capability.

Maintaining the readiness and sustainability of our combat forces remains our second priority. Ready forces form the basis of our capability to engage the enemy effectively on the first day of fighting. Readiness is the sum of proficiency and sufficiency; it requires that forces be trained under realistic conditions and stocks of spares be available at the beginning of combat. Sustainable forces must have the "staying power" to fight during and beyond an initial period of combat. To do that, they depend on the nation's ability to generate adequate spares, supplies, munitions and fuel to replace those resources consumed or attrited in battle. Moreover, sustainability results only when peacetime stocks, the support infrastructure, war reserve material and the industrial base permit it.

Since 1981, we have sought to reduce serious shortfalls in peacetime and wartime stocks while preserving ready forces. With the 1985 appropriations, our inventories are healthier than they have been in years. This year's request will continue to emphasize funding of peacetime and wartime reserve spares. In addition, emphasis will be given to initial spares for the B-1B strategic bomber, the Peacekeeper Strategic Missile and the C-5B airlift aircraft. Replenishment aircraft spares and missile spares also require continued support to maintain both high level peacetime readiness and wartime sustainability.

Simulators and trainers continue to grow in importance as we strive to provide realistic training to aircrews. More efficient and effective trainers promise important combat returns on our investment. Weapon system modifications accomplish three things: they improve reliability and maintainability and increase service life, they improve capability and they improve safety. Structural and electronic modification programs are extending the life of C-130, KC-135 and F/RF-4 airframes and enhancing the avionics capabilities of F/FB-111 and B-52 aircraft. Finally, we continue to fund war consumables and aircraft common ground equipment to further strengthen our responsive combat forces.

Our third mission priority is to enhance force projection. Our nation's military strategy depends on a mix of U.S. based and forward deployed forces. Airlift, sealift and prepositioned mobility forces serve as the link between our force structure and its combat power. Together they provide the means to rapidly project and sustain a balanced fighting force on a global scale. Although the mobility forces are complementary, only airlift provides the flexibility and rapid means to respond to time-sensitive situations.

The Congressionally Mandated Mobility Study formed the basis for the Airlift Master Plan. Although past favorable funding has increased our inter-theater airlift significantly, we are requesting a continuation of measured growth to achieve the master plan goals. These goals are three phased: near, mid and long-term force improvements.

Near term improvements include C-5A and C-130 wing modifications to extend airframe life and the purchase of a variety of Operational Support Aircraft. Mid-term improvements include augmenting our force projection and airlift fleet with KC-10s and improved C-5Bs and funding the Civil Reserve Air Fleet enhancement program to modify existing commercial aircraft for use in a national emergency. Far term improvements rest on the development and procurement of the intercontinental C-17 airlifter. The C-17 will provide an inter- and intratheater outsize capability not currently available.

Specialized airlift requirements are being driven by contemporary events such as an increase in terrorism and a realignment of service functions. It is essential that the U.S. maintain special operations forces capable of conducting missions throughout the world. We are therefore requesting additional MC-130H Combat Talon aircraft and asking for faster development of the advanced vertical lift aircraft to bridge the gap between helicopters and fixed wing aircraft. To meet its responsibilities for combat rescue and recovery deep behind enemy lines, the Air Force requires additional improved rotary wing aircraft. The HH-60A helicopter with improved avionics and precision navigation will provide this low-level night and under-the-weather capability.

Modernizing and expanding our theater forces represent the fourth mission area priority. Last year, events in the Persian Gulf and Central America demonstrated the global nature of U.S. commitments. We have increased emphasis on sharing mission responsibilities among active and air reserve forces and on exploiting our technology advantage to counter numerical superiority. Our budget request strikes a prudent balance between modernization and expansion and the supporting programs which improve near term readiness and sustainabilty.

The Air Force's Tactical Fighter Roadmap outlines our procurement strategy for a total fighter force. The roadmap applies the composition of today's force against worldwide theater fighter requirements. The three components of the recommended roadmap strategy are: procurement of additional fighters toward development of a 40 tactical fighter wing force plus an adequate air defense force; an appropriate mix of fighters for flexibility to accomplish specialized and multirole missions; and quality improvements to accomplish more demanding high threat missions. The F-15 will remain the primary air-to-air fighter, but the procurement of additional F-16s will make the F-16 the backbone of our force structure. The centerpiece of the roadmap is the acquisition of the F-15E which augments the limited F-111 fleet in the night/adverse weather deep interdiction role and performs an air-to-air and air-to-surface mission. Our next-generation 1990s aircraft is the advanced tactical fighter. It will exploit advancing technology and ensure we can meet the evolving Soviet threat. Quality improvements to our existing fighters include the continued development and deployment of the Low Altitude Navigation and Targeting Infrared System for Night. Improved fighter engines are now being procured for F-15s and F-16s and increased performance engines will be developed for F-15s/F-16s for use in late 1980s.

Our current munitions inventory includes a large percentage of older weapons for today's high threat tactical environment. The Air Force Munitions Acquisition Plan guides procurement of munitions that are the most cost effective, i.e., that have greater success rates with reduced aircrew loss. While the Advanced Medium Range Air-to-Air Missile is our next generation air-to-air missile, we must continue to procure the reliable AIM-7M and AIM-9M missiles to adequately arm our aircraft. We also plan to procure additional air-to-surface munitions such as the Imaging Infrared Maverick, Combined Effects Munitions and airfield attack weapons. We intend to develop effective standoff attack weapons to ensure effectiveness against high value fixed and mobile surface targets.

Modernizing theater forces also requires improving our defensive and electronic combat suppression capabilities, airborne tactical warning and control, anti-jam and secure voice aircraft communications and tactical reconnaissance. Finally, the continued deployment of the Ground Launched Cruise Missile and the development and deployment of a credible chemical retaliatory weapon will reestablish a credible theater deterrent within those weapons families.

The success of the Air Force research, development and acquisition program depends on a strong, efficient management system. During the past two years the basic process through which we acquire complex weapon systems has been subjected to meticulous evaluation, and numerous management techniques have been refined to insure better control of our resources. In conjunction with this budget submission, a broad range of these improvements will be continued.

High costs of systems are being reduced through a variety of techniques including multiyear contracting, leader-follower practices, dual sourcing, recompetition and other techniques. Reforming spare parts and support equipment acquisition is a top priority. We are dedicated to increasing the rate of competition across the board in Air Force contracting and we have established the office of the Air Force Competition Advocate to further this goal. Firm goals and specific steps to reach them have been set in motion. Program stability continues to be an important management and programmatic objective.

Several industrial base initiatives are directed at improving both the quality and cost effectivensss of contractor-produced goods and services. The Air Force will maintain an active effort to build a sound industrial foundation for its research, development and procurement programs and to enhance wartime readiness and sustainability. The quality of our systems is receiving top level attention. We now require that reliability and maintainability be given the same priority as cost, schedule and performance.

Better Air Force contracts will be possible only through the fine efforts of our professional contracting staffs. Included among the 1986 initiatives are programs designed to improve training, lengthen program director assignments and reward the people who help strengthen our system of competition.

Since 1981, we have made substantial progress toward the commitment to ensure that our military capabilities are strong enough to fulfill their vital purpose. To support this commitment, Air Force RDT&E and procurement programs are prudently structured to sustain the progress achieved. The Fiscal Year 1986 budget request continues a careful balance based on a realistic assessment of the threats. The success of this commitment depends substantially upon completion of the plan initiated with the FY 1982 budget.

Congressional approval and funding for our Fiscal Year 1986 budget request will allow us to continue the plan, restore our position of strength, demonstrate unified national resolve and protect and defend worldwide national interests.

SECTION I

INTRODUCTION

RESTORING THE MILITARY BALANCE

Four years ago, the President initiated a carefully planned program to reverse the dangerous trend toward Soviet military superiority that was developing at the end of the last decade. The impact of substantial real growth in American military investment over the last four years is now apparent in upgraded combat capabilities, significant progress in weapons modernization programs, and improved readiness and sustainability for the United States Air Force. The Air Force research, development, procurement, and logistics budget request for Fiscal Year 1986 is structured to continue this progress toward restoring the strength of our defenses. The priorities reflected in this budget request are consistent with the program established four years ago: modernize our strategic forces, build combat readiness and sustainability, enhance force projection, and modernize and expand our theater forces.

Our success in restoring the military balance hinges on completing the implementation of the plan we began in FY 1982. Crucial components of that plan, particularly Intercontinental Ballistic Missile (ICBM) modernization, will be under consideration during the Fiscal Year 1986 budget deliberations. The Air Force's Fiscal Year 1986 budget request has been developed to fully capitalize on the solid foundation created by the budgets of the last four years. This request is the product of a critical and thorough assessment of required military capabilities, program priorities, and resource limitations. It embodies a rational balance among these competing considerations. Full Congressional support for the Air Force's Fiscal Year 1986 budget request will be important to ensure that the course we have set toward an assured and enduring deterrent posture can be achieved in the most efficient and cost effective manner.

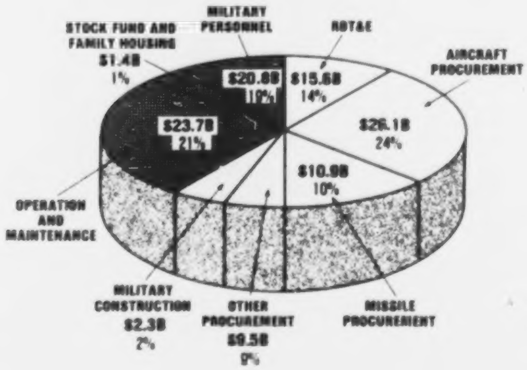
THE FISCAL YEAR 1986 AIR FORCE BUDGET - INVESTMENT ACCOUNTS

The Air Force Fiscal Year 1986 budget request reflects a deliberate and prudent balancing between and within the investment and operating accounts. This budget will enable the Air Force to respond to the military challenges it faces now and anticipates in the future with combat capabilities which will be effective across the full spectrum of conflict. It recognizes that the threats to our national interests come from many different quarters around the world and at different levels of military strength and sophistication. We must be prepared to respond as necessary with a combat capability which is flexible and strong enough to answer any of these threats. The Air Force's

Fiscal Year 1986 budget request provides the balanced combat capability the nation requires to maintain security at home and to honor its wide-ranging commitments abroad. At the same time, it also provides the proper balance between the funding of current readiness and sustainability on the one hand and investment in the development of future capabilities on the other.

The diagram below illustrates the breakdown among the major appropriation categories of the Air Force Fiscal Year 1986 budget. The clear sectors comprise the investment accounts and the hatched sectors the operating accounts. Shown in each sector are the dollars requested for Fiscal Year 1986 and the associated percentage of the total request for each account.

USAF BUDGET REQUEST
1986
$110.3B



Summary Fiscal Year 1986 funding estimates for individual Research, Development, Test and Engineering (RDT&E) and procurement programs are provided at Appendix A. More detailed information and program justification are provided to the Congress under separate cover. This detailed justification information is contained in the Department of the Air Force Justification of Estimates for Fiscal Year 1986 for the procurement programs and in the Descriptive Summaries for Fiscal Year 1986 for the RDT&E programs. Information on military construction programs is also provided to the authorization and appropriation committees of the Congress.

SCIENCE AND TECHNOLOGY

The United States no longer enjoys the unchallenged technological superiority it once held over the Soviet Union. Through steadily growing Research and Development (R&D) investments and covert means, the Soviets have greatly narrowed the gap in technological sophistication which formerly existed between American and Soviet military systems. Since America continues to rely on its technological superiority to offset Soviet numerical advantages in most weapon systems, the future security of the United States is heavily dependent on the success of its military science and technology program.

We have in the field today such modern and capable systems as the F-15 and F-16 only because of the prudent investments we made in our technology base as long as 30 years ago. The capabilities of tomorrow's major weapon systems will be directly traceable to the investments in science and technology we are making today. Current problems are solved and avenues are opened up for the development of new weapons through Air Force programs in basic research, exploratory development, and advanced technology development. These programs did not benefit substantially from the real growth which occurred in other areas of the Air Force budget in recent years because of the higher priority placed on other pressing needs, such as operational readiness. In the early 1980's, technology investment fell from about 2 percent of Air Force Total Obligational Authority (TOA) to less than 1.5 percent. The Air Force Fiscal Year 1986 budget seeks to reinvigorate our science and technology program and redress this decline. We plan gradual increases in science and technology funding with a goal of 2 percent of Air Force TOA.

Among the emerging technologies we expect to make significant contributions to future military system capabilities are: artificial intelligence, sensor fusion, advanced composite materials, advanced avionics architecture, very high speed integrated circuits, and high order languages for computers.

We expect artificial intelligence to be applied to great advantage in aiding decision making in future combat. Artificial intelligence will enable us to automate some functions now accomplished manually in command and control systems, such as targeting and mission planning. The commander's job will be made easier through the analytical power and speed of the artificial intelligence systems he can use to aid force employment/disposition decisions in complex battle scenarios.

Sensor fusion developments will facilitate real time target classification and multi-sensor correlation, thus increasing the quality and timeliness of military intelligence.

Advanced composite materials will enhance the survivability and reduce the weight of future aircraft, missile, and space systems. Other payoffs from the use of composites will include better performance, lower cost, and improved system durability.

Advanced avionics architecture will allow the integration of many subsystem functions handled autonomously in today's systems. Weapons delivery, engine management, cockpit controls/displays, flight controls, communications, and navigation are examples of functions which might be integrated. This integration would allow, among other things, higher mission reliability and reduced aircrew workload.

The Very High Speed Integrated Circuits (VHSIC) program remains one of our most important technology efforts. The VHSIC program was initiated to develop two generations of high-speed, very large scale integrated circuits for military systems that will yield significant weight and size reductions while providing orders of magnitude increases in reliability and throughput. We are now transitioning the development thrust of the VHSIC program from the first generation (Phase 1, 1.25 micrometer chips) to the second generation (Phase 2, 0.5 micrometer chips). At the same time we are continuing VHSIC Phase I technology insertion efforts into Air Force systems ranging from radars to autonomous weapons.

A final example of an important technology effort is the work now being done on Ada, the Department of Defense (DOD) common, high order computer language. DOD computer software life-cycle costs are currently in the billions of dollars, and increased use of computers will cause software costs to escalate in the future. By transitioning to Ada in defense systems, DOD will derive substantial cost benefits in software development and maintenance, education and training, and many other areas.

Continued emphasis on revolutionary technologies will forestall technological surprise and enable the Air Force to develop timely responses to the evolving threat. At the same time, we will continue prudent investment in the evolutionary technologies necessary to enhance system reliability, maintainability, durability, and cost effectiveness.

SECTION II

STRATEGIC FORCES

Our strategic nuclear forces exist primarily to deter attack or aggression on the United States, our allies and other countries whose security is vital to our national interests. In recent years the Soviet Union has significantly increased its offensive capability and enhanced its ability to place our forces at risk. Soviet progress in strategic weaponry has been characterized by both massive force expansion and aggressive modernization.

The credibility of America's deterrent posture depends on Soviet perceptions that the United States has capable forces and the national resolve to use them, if necessary. The existing numerical imbalance of strategic forces coupled with the rapid pace of Soviet modernization diminish that credibility.

The Air Force Fiscal Year 1986 budget request continues the President's strategic modernization program. The objectives of that program are to: restore stability to the balance of strategic power, send a clear signal of our national resolve to strengthen our defenses and encourage the Soviet Union to rejoin the United States in meaningful negotiations for nuclear arms control. Firm adherence to the modernization plan and steady progress in the execution of our strategic programs are essential to the achievement of these objectives.

STRATEGIC OFFENSE

Our strategic offensive forces comprise a Triad of submarine launched ballistic missiles, land-based intercontinental ballistic missiles and long-range manned bombers. These three elements provide a mix of force characteristics which ensures maximum effectiveness and flexibility in responding to the Soviet threat. The Triad also complicates Soviet offensive and defensive planning because of difficulty in planning and executing a successful, simultaneous attack on all three elements.

The U.S. ICBM leg has three central purposes. First, the ICBM force serves as a hedge against possible vulnerabilities in our submarine force (e.g., a Soviet breakthrough in anti-submarine warfare). Second, ICBMs introduce complexity and uncertainty into Soviet attack plans, because different types of attacks are required to defeat our ICBM, submarine and bomber forces. Third, ICBMs help deter Soviet threats of massive conventional or nuclear attack by virtue of their ability to respond promptly and controllably against hardened military targets.

The need for ICBM modernization stems from the requirement to respond to the pace and scope of Soviet ICBM development and deployment. The Soviet Union has deployed over 800 SS-17s, SS-18s, and SS-19s that have excellent accuracy and payloads as large or larger than Peacekeeper's. In addition, the current U.S. ICBM force is aging significantly. Titan II is being retired, and rehabilitation programs are required to keep Minuteman missiles operational. Meanwhile, Soviet SS-17, SS-18, and SS-19 missile systems (representing over half of the Soviet ICBM force) have been deployed since the last U.S. ICBM deployment.

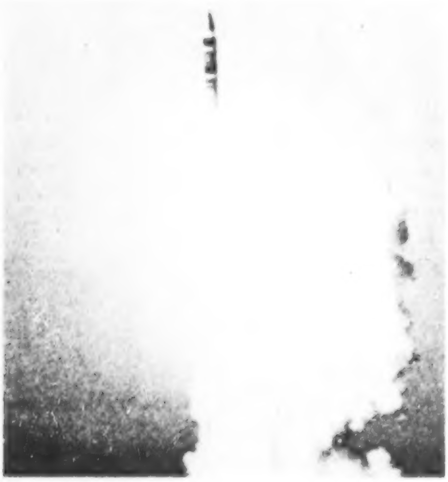
To address the strategic imbalance, the President endorsed the ICBM Modernization Program in April 1983. The program was recommended by the Commission on Strategic Forces (Scowcroft Commission) and subsequently approved by the Congress. This program was built on the recognition that all ICBM tasks cannot be served by a single weapon system. Accordingly, the Commission recommended (1) promptly deploying 100 Peacekeeper missiles in existing Minuteman silos; (2) initiating engineering design of a single warhead ICBM leading to deployment in the early 1990s; and (3) vigorously investigating follow-on basing technologies, including hardened vehicles and silos.

The main purpose of deploying the Peacekeeper missile system by December 1986 is to more effectively deter Soviet threats of massive conventional or nuclear attack against the U.S. and our allies. By virtue of its improved damage expectancy against hardened military targets, Peacekeeper accomplishes several strategic objectives.

First, the near-term Peacekeeper deployment begins to offset Soviet counterforce advantages created by Soviet ability to destroy hardened U.S. land-based targets. Peacekeeper has the range, yield, and accuracy to place at risk all Soviet target types--hardened and unhardened--with the most reliable and responsive leg of the Strategic Triad. Second, deploying Peacekeeper in existing Minuteman silos redresses the aging problem of the U.S. ICBM force. Third, Peacekeeper deployment encourages the Soviet Union to negotiate stabilizing arms control agreements by providing a tangible incentive to move toward less valuable deployments. Thus, the Peacekeeper deployment is the necessary step toward enhanced deterrence, increased strategic stability, and meaningful arms control negotiations.

The Peacekeeper is a four-stage intercontinental ballistic missile (ICBM) configured to deliver up to 10 Mark 21 reentry vehicles to different targets. Peacekeeper uses a state-of-the-art Advanced Inertial Reference Sphere guidance system to attain its high degree of accuracy.

Peacekeeper will be more accurate, carry more warheads, have greater range, and be more resistant to nuclear effects than other ICBM systems currently in the U.S. inventory. This enhanced capability will begin to offset the Soviet threat to present U.S. ICBM systems and help deter nuclear attacks on the United States and our allies by improving damage expectancy against the Soviet target base.



Peacekeeper Intercontinental Ballistic Missile

The Peacekeeper R&D flight-test program, consisting of 20 planned launches, was initiated at Vandenberg AFB, California in June 1983. Phase I of the flight test program, including the first five launches, was completed in June 1984 and was designed to test missile functional performance. Flight test 6, completed in October 1984, marked the beginning of Phase II of the flight test program. Phase II is designed to test missile/reentry vehicle capabilities and silo integration. Peacekeeper accuracy during the early phase of the test program has been outstanding. Flight tests 7 through 10 are scheduled for 1985.

The Peacekeeper missile deployment in southeastern Wyoming and the southwestern Nebraska panhandle will be supported by the 90th Strategic Missile Wing at F.E. Warren AFB, close to Cheyenne, Wyoming. One hundred Peacekeeper missiles will replace 100 Minuteman missiles in existing silos. Very little structural modification will be needed. Initial operational capability for the system is scheduled for December 1986 with 10 missiles deployed in Wyoming. Full operational capability of 100 missiles--69 in Wyoming and 31 in Nebraska--will occur by December 1989.

Full-scale development for basing began in June 1983. A draft Environmental Impact Statement was issued in October 1983. Public hearings were held in early November, and the final statement was released in January 1984. Construction of support facilities began in mid-1984, and above ground silo modifications will begin in early 1985.

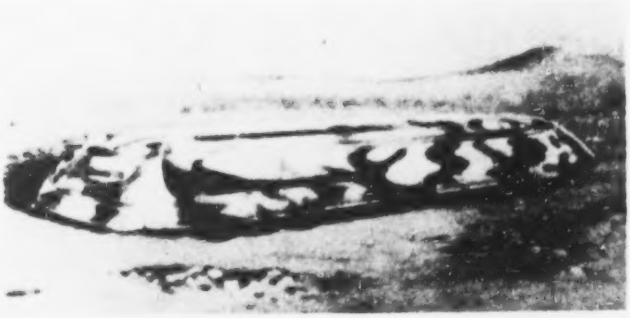
In 1984, the Peacekeeper program transitioned from engineering development to full-scale development and production. Primary and associate contracts were awarded for all four missile stages. Eight contracts were awarded in January 1984 to support the guidance and control production effort. In addition, 22 associate contracts were awarded in April 1984 for the production of the Peacekeeper reentry vehicle, reentry system and fuze. Work was also conducted to support the Peacekeeper guidance and control system housed in Stage IV.

The first phase of the Peacekeeper flight test program has been completed successfully. The 41 reentry vehicles deployed on Peacekeeper flight test missiles to date have demonstrated excellent accuracy. Basing development and production activities are off to a good start. Deployment planning is well underway, and support activities are in progress. In short, the Peacekeeper Missile Program is on schedule and within cost. Deployment of the first 10 operational Peacekeeper missiles will be achieved by December 1986. Fiscal Year 1986 funding will be used to continue missile production, conduct testing and evaluation, construct support facilities and plan for deployment.

The Department of Defense and the Air Force are continuing development of the Small Intercontinental Ballistic Missile and hardened mobile transporter. Following the recommendations of the Schriever Commission, the Air Force appointed a general officer in July 1984 to direct the Small ICBM Program Office development and acquisition strategies for both missile and basing technologies.

The Schriever Commission also recommended the three phase program strategy that is currently being implemented by the Air Force. This program includes a competitive systems definition phase, a competitive pre-full scale development phase, and a full scale development phase. The system definition phase is nearing completion. This phase builds on Peacekeeper technology as well as assessing alternative technologies to ensure success in meeting the challenging goals mandated for the Small ICBM. The pre-full scale development phase began in late 1984 and will continue with competitive contracting for weapon systems integration, propulsion, and hard mobile launcher. The full scale development phase for the basing mode or modes will begin in FY 1987. This program will lead to flight testing in 1988 with initial operational capabilities in 1992.

In order to meet the Small ICBM goals set forth by the President's Commission on Strategic Forces, the Office of the Secretary of Defense and the Air Force are directing top level management attention to the program. The Air Force has formed a General Officer Small Missile Advisory Group to recommend the best plan for development, production and deployment of the small missile system. Both a Small Missile Review Panel and a Small Missile Steering Group were established to ensure that potential small ICBM basing modes will be continued with FY 1985 and Fiscal Year 1986 funding.



Small ICBM Mobile Launcher (Artist Concept)

Eighteen development contracts have been awarded during the Small ICBM concept definition phase. They encompass efforts in propulsion, Hard Mobile Launcher, guidance and control, command, control and communications and weapons system concept definition. Competition is currently underway for pre-full scale development contracts for assembly test and system support, booster and Hard Mobile Launcher systems. Efforts in the Small ICBM guidance research and development, the most challenging portion of the Small ICBM program, continue under initial development programs.

Hard Mobile Launcher hardness validation began in October 1984 and will continue in 1985. This testing is part of the joint Air Force and Defense Nuclear Agency program to define nuclear environment levels pertinent to hard mobile basing concepts.

Research and development is continuing in silo hardening and deep basing technologies. Past tests and development activities have yielded impressive results in both areas.

Testing of silo component materials began in 1983 and continued in 1984. All of these tests were successful. Implementing the recommendations of the Scowcroft Commission, the Air Force and Defense Nuclear Agency began a three-year program in 1983 to demonstrate and validate superhard silo technologies through large-scale tests. As part of this program, subsize tests and shock isolation system technology efforts in 1984 have been quite successful, providing confidence that predicted hardness levels will be achieved. Fiscal Year 1986 funding will be used to continue development and testing of superhardening technologies.

Significant progress was also made in deep basing technology development and subsystem engineering and demonstration. Technology development efforts are concentrated on the effects of nuclear weapons on deep underground facilities; evaluation of alternative power, heat sink and life support systems; through-the-earth communications; and improving tunneling technology. Subsystem engineering and demonstration efforts include missile egress, launch, power and heat sink systems. Fiscal Year 1986 funding will support continued testing to validate technology and further analysis efforts involving concept definition and system configuration.

To ensure the effectiveness and penetrativity of the U.S. ICBM force, the Advanced Strategic Missile Systems (ASMS) program will continue development of advanced ballistic missile technologies in Fiscal Year 1986. A high priority ASMS program will develop and flight test ICBM penetration system options to provide an effective penetration counter to on-going Soviet Ballistic Missile Defense (BMD) upgrades. Development efforts are also being conducted to increase U.S. reentry vehicle accuracy and survival as a hedge against Soviet target hardening and expanded BMD capabilities. ASMS programs develop critical technologies which reduce full scale development risk and decrease the time required to respond to identified force deficiencies, mission changes or evolving threats. Results are made available to both the Army and Navy.

Enhancements are being made to the Minuteman weapon system to maintain viability of the force, to improve operating efficiencies, and to maintain compatibility with other Single Integrated Operational Plan forces. We began installing long-life lithium batteries in 200 Minuteman III launch facilities in FY 1984 and will continue through Fiscal Year 1986. These batteries supplement existing power sources and multiply available emergency power time by a factor of 15. Software changes for the guidance upgrade program were completed in FY 1984. This program improves Minuteman III accuracy, and will be completed by 1986. Other modification projects support reliability and maintainability upgrades. Test equipment that is becoming unsupportable is being replaced starting in 1985, and development of a new Minuteman II Stage 3 motor to replace the current aging motor begins in Fiscal Year 1986. These and other programs will keep Minuteman a credible part of the nuclear deterrent force through the year 2000.

The second leg of the Triad is the manned bomber. Because it can be recalled, is reusable, and can accurately deliver both nuclear and conventional gravity weapons and cruise missiles, it is our most flexible leg. The bomber can be easily dispersed and is launched under positive control. The bomber can also provide a very effective show-of-force anywhere on the globe within a 24 hour period.

The mainstay of our strategic bomber force is the B-52. The B-52 fleet, currently consisting of 263 aircraft, is augmented by 61 FB-111As, and will soon be further augmented by deployment of the B-1B bomber. These bomber aircraft are capable of attacking targets across the entire spectrum of conflict. In addition to their traditional nuclear role, bomber aircraft have assumed an expanded conventional and maritime role. B-52 bombers have been modified to carry even larger conventional payloads as well as Harpoon missiles. B-52 bombers now perform sea lane defense, mine laying and sea surveillance missions.

Recognizing the need for a manned bomber and the limitations in our existing bomber forces, we have launched a phased modernization program for the air-breathing leg of the Triad. The B-52 is being modified for carriage of the Air Launched Cruise Missile (ALCM) assuming a role it will serve into the 1990s. Eventually the newer B-52H aircraft will be capable of carrying 20 cruise missiles, 12 externally and 8 internally. The B-1B will be deployed to eventually replace the B-52. By the end of the decade, the B-1B will be our primary penetrating bomber with the B-52 transitioning to cruise missile carrier and conventional/collateral roles. The Advanced Technology Bomber (ATB) will be deployed in the early 1990s to complement the B-1B and ensure that our bombers will be able to penetrate Soviet defenses.

Within the scope of the bomber modernization program, we are updating certain outdated systems on the B-52. This program includes a new offensive avionics system, improved electronic countermeasures, an update of the airborne radar and a new autopilot. These system improvements will ensure that the B-52 continues to operate effectively in the roles currently assigned to it consistent with its projected operational life.

Sixty-nine B-52G aircraft will not be modified for cruise missile carriage and will be used in a conventional role. In December 1984, we achieved an Initial Operational Capability (IOC) of 10 aircraft at Loring AFB, Maine with the AGM-84 Harpoon anti-ship missile. All 69 aircraft will be modified for Harpoon carriage by June 1985. Andersen AFB, Guam, will be the second unit to be equipped with the B-52G/Harpoon system. The Strategic Conventional Standoff Capability program will provide conventional improvements for present and future bombers. As part of this program, an integrated conventional stores management system will provide programming, monitoring and launching of modern standoff weapons. Improved targeting sensors, the other part of this upgrade, will insure detection, classification and engagement of virtually all target classes.

B-52 Bomber

On 4 September 1984, the first production B-1B bomber rolled out of its final assembly facility. By September 1986, the first B-1B squadron of fifteen aircraft will reach its initial operational capability at Dyess AFB, Texas. As the lead component of the President's two bomber program, the B-1B will perform the multi-role missions of a conventional bomber, a cruise missile launch platform and a nuclear weapons delivery system.

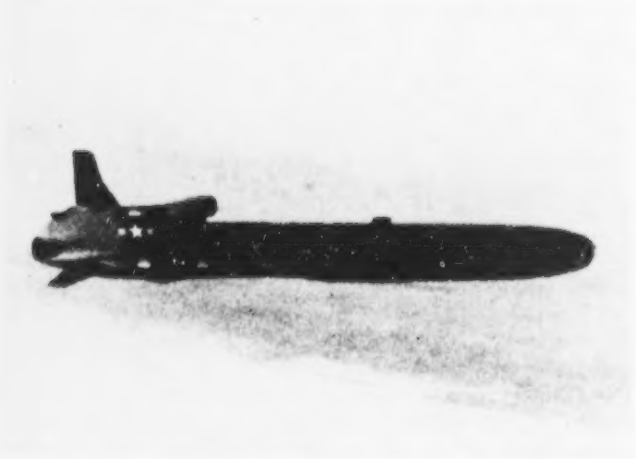
B-1B Bomber

B-1A number two crashed during a test flight on 29 August 1984. Although some restructuring of the cruise missile integration effort will be required, there will not be a significant impact to the B-1B test program. There will be no impact on capabilities demonstrated by IOC.

B-1B aircraft number one flew its maiden sortie on 18 October 1984, five months ahead of contractual schedule. The program remains ahead of schedule and within budget. B-1B aircraft number two is expected to be delivered to the Strategic Air Command by 30 June 1985. The Fiscal Year 1986 RDT&E program includes the integrated systems testing on the B-1B number one aircraft, offensive and defensive systems testing on B-1A number four aircraft and the start of cruise missile testing on B-1B aircraft number nine. We will continue full scale development efforts through sustained flight testing, software and hardware development, and integrated logistics support activities. Along with additional initial spares procurement, the final lot of 48 aircraft will be procured with Fiscal Year 1986 funds. Full operational capability will be in June 1988.

The Advanced Technology Bomber will follow the B-1B and is designed to ensure that our Triad of forces has the advantage of new developments in low observable technology to combat expected advances in Soviet defenses. Although development and procurement plans remain classified, we can state that the program is fully funded, is within cost and remains on schedule for an early 1990s initial operational capability.

The Strategic Air Command is conducting follow-on operational test and evaluation on the AGM-86B Air Launched Cruise Missile. Fiscal Year 1986 production funds are for ALCM support equipment. RDT&E funds will be used to complete depot support equipment development. Mission planning and missile software improvements continue.



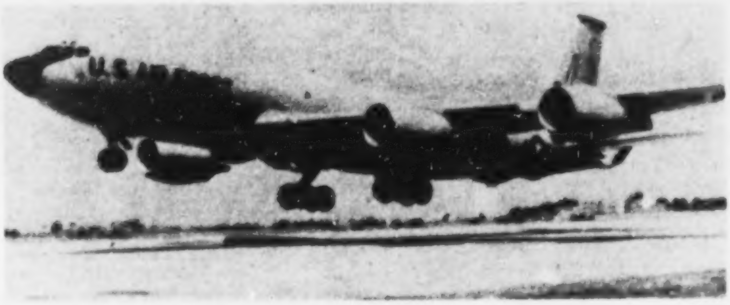
Air Launched Cruise Missile

The Advanced Cruise Missile (ACM) is a second generation cruise missile and is being developed to ensure our bomber fleet has a potent standoff weapon for the 1990s and beyond. The new missile provides improvements over the AGM-86B in range, accuracy and survivability. We have developed a coordinated ALCM-B/ACM acquisition plan that introduces the advanced missile at the fastest prudent pace consistent with the ALCM-B production program. The ACM will join the current generation cruise missile in a mix of approximately 3000 strategic cruise missiles deployed on the B-52 and B-1B aircraft. This combination provides a responsive, long term contribution to the deterrent effectiveness of our air-breathing forces.

Formerly called the Advanced Air-to-Surface Missile, the Short Range Attack Missile II (SRAM II) will replace the aging SRAM on the B-1B and the Advanced Technology Bomber. The unique capability, to severely stress terminal defenses with a supersonic missile, must be retained to prevent optimization of defenses against cruise missiles. It is not the intent of this program to stress technology limits but rather to apply existing technology to build a SRAM II. SRAM II will begin full scale development in early Fiscal Year 1986.

The Common Strategic Rotary Launcher (CSRL) is a multi-purpose launcher for carriage of existing and future nuclear bombs and missiles and projected conventional standoff munitions. In the near term, the CSRL will be integrated into the B-52H and B-1B to carry either gravity weapons or cruise missiles. The Critical Design Review, which formalized design of the launcher, was successfully completed. Developmental launchers have since been produced to support B-52 ground and flight testing in Fiscal Years 1985 and 1986. Activities are being pursued which will allow full production as soon as possible.

Our tanker fleet falls short of being able to meet the fuel offload demand created by strategic, tactical, and airlift forces. The KC-135R Modernization Program will help reduce that shortfall by increasing each KC-135's offload capability by about 50 percent. The key element of the modernization program is the re-engining with more powerful, fuel efficient F-108 engine (the military version of the commercial CFM-56-2). This engine allows takeoff with over 14,000 pounds more fuel and burns 27 percent less fuel inflight than the aircraft's current J57 engine. On an airframe that is structurally sound well beyond the year 2000, the new engines, plus 25 other system/subsystem improvements, give us an improved tanker with enhanced capability and improved reliability, maintainability and supportability; and it gives us a modernized tanker at less than one-third the cost of a new aircraft. Our Fiscal Year 1986 request is for 43 KC-135R kits.



KC-135 Tanker Aircraft

The KC-135E re-engining program replaces the KC-135A's increasingly obsolete, 1950s technology J57 engines with JT-3D turbofan engines removed from Boeing 707 aircraft being retired from commercial service. The 707 "donor" aircraft also provide additional modification components, but of a more limited nature than the KC-135R effort. Over the past several years, Congress has added funds to the Air Force request to re-engine Air Reserve Forces' KC-135s with the JT-3D. Besides providing a near-term solution to specific problems with the Air Reserve Forces' KC-135As, the KC-135E's 20 percent offload improvement helps ease the tanker shortfall.

STRATEGIC COMMAND, CONTROL AND COMMUNICATIONS

Our strategic Command, Control, Communications (C^3) systems are composed of fixed and mobile command centers and ground, airborne and space communications platforms. Collectively, these systems connect warning sensors, command and control centers and nuclear forces during peacetime and all phases of conflict.

The capability of the U.S. nuclear forces to deter attack depends upon the Soviet's perception of their own capability to successfully launch a pre-emptive first strike. Through our strategic C^3 systems, we report events that are critical to the survival of strategic forces. Strategic C^3 systems provide the link between the National Command Authority and the JCS, through the Unified and Specified Commands, to U.S. nuclear retaliatory forces.

Due to its importance to deterrence, upgrade of U.S. strategic C^3 was made the first priority of the President's strategic modernization program. These upgrades will enhance the resilience of these systems against physical attack, under jamming or spoofing conditions and nuclear effects environments.

Although no one system can achieve all the desired characteristics to meet the current and projected threat, a proper mix of ground based and satellite systems, along with redundancy of critical C^3 nodes, will provide high confidence that our strategic C^3 systems would survive and endure through the trans- and post-attack time periods. All elements of our strategic deterrent force must be perceived to be strong if our deterrent is to remain credible.

A major near term improvement program is the modernization of the Worldwide Military Command and Control System (WWMCCS). WWMCCS standard automatic data processing (ADP) has provided automated command and control (C^2) support to the National Command Authorities, Joint Chiefs of Staff, Specified/Unified/Component commanders and related C^2 functions for over a decade.

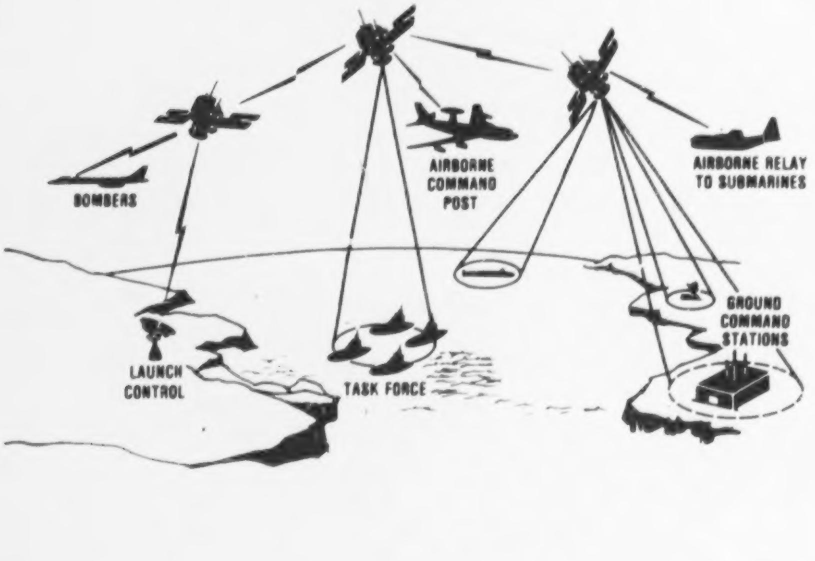
The WWMCCS Information System (WIS) is a joint service/defense agency program which will replace the aging WWMCCS Standard ADP in an evolutionary manner beginning in FY 1987. WIS will modernize computer software, hardware and directly related telecommunications through application of modern data management tools such as the Ada programming language, intelligent workstations and local area networks.

In Fiscal Year 1986, the first block of WIS will complete full scale engineering development. The local area network and automated message-handling software will be installed at operational test sites. Detailed design and development of the joint mission software begun in FY 1985 will increase significantly. System development test and evaluation will continue.

The Milstar satellite communications system will be a survivable, jam-resistant and secure, worldwide communications system for the National Command Authority. It will support the strategic and tactical forces of all services. By employing advanced countermeasure techniques, Milstar will be highly survivable and provide the minimum essential communications needed at all potential levels of conflict. Milstar is a crucial part of the President's strategic modernization program and has been designated as a program of highest national priority.

MILSTAR

SATELLITE COMMUNICATIONS SYSTEM



The Air Force is developing the satellites, system control equipment and airborne terminals, while the Army and the Navy are developing ground and seaborne terminals, respectively. Deployment of the Milstar system will begin in the late 1980s and continue into the 1990s.

The Air Force Satellite Communication (AFSATCOM) system provides command and control of strategic forces and is used in peacetime for training, contingency operations, crisis management, search and rescue, humanitarian missions and relay of reconnaissance information. Its primary wartime function is to provide worldwide, two-way command and control communications for the National Command Authorities, the Joint Chiefs of Staff, the Commanders-in-Chief of U.S. strategic nuclear forces and other high priority users.

AFSATCOM consists of ultra high frequency communications packages in orbit aboard Fleet Satellite Communications satellites, Satellite Data System satellites and other host spacecraft. The ground segment consists of terminals for airborne and ground command centers, strategic bomber and reconnaissance aircraft, airborne communications relay platforms and selected Army missile sites.

Last year we achieved full operational capability with more than 500 ground and airborne terminals installed and operating. We are now upgrading AFSATCOM terminals to permit transition to the Milstar satellite communications system. These modifications will also improve terminal performance during jamming and in periods of ionospheric disturbances. By starting this effort now, virtually all the AFSATCOM terminals will be capable of using the Milstar spacecraft ultra-high-frequency channels after the first Milstar launch.

The Minimum Essential Emergency Communications Network (MEECN) insures delivery of critical messages under stressed conditions. New very-low-frequency/low-frequency receivers are in development to provide long range, survivable, data communications to the strategic bomber aircraft. Also, the Ground Wave Emergency Network, currently in full scale development, will provide the MEECN with its first C^3 system designed to meet the high altitude electromagnetic pulse threat.

The Ground Wave Emergency Network (GWEN) will provide assured communications among the National Command Authority, major command centers, missile warning sites, and U.S. based nuclear forces. Survivable communications are provided through a network of radio relay stations that interconnect user terminals at these installations.

Full scale development of the prototype network, including relay stations, input and output ground and airborne terminals, and receive-only terminals, began in February 1983 and will continue through early 1986. During Fiscal Year 1986, prototype network testing will be concluded. We will conduct initial operational test and evaluation and, with those results, make a production decision in 1986. Full operational capability is planned for FY 1989.

Our MEECN very low frequency/low frequency (VLF/LF) improvements project provides for improved dissemination of war orders through secure VLF/LF Systems. In Fiscal Year 1986, we are continuing the development of the Diversity Reception Equipment for deployment aboard Worldwide Airborne Command Post aircraft and at selected sites. This new equipment will upgrade and replace existing equipment in both ground and airborne transmit and receive applications. Communication range, message accuracy and transmission time will be greatly improved. Also, development will continue for the VLF/LF miniature receive terminals for bomber aircraft. These receive terminals will provide a new communications link for the bomber aircraft that will be unaffected by atmospheric disturbances.

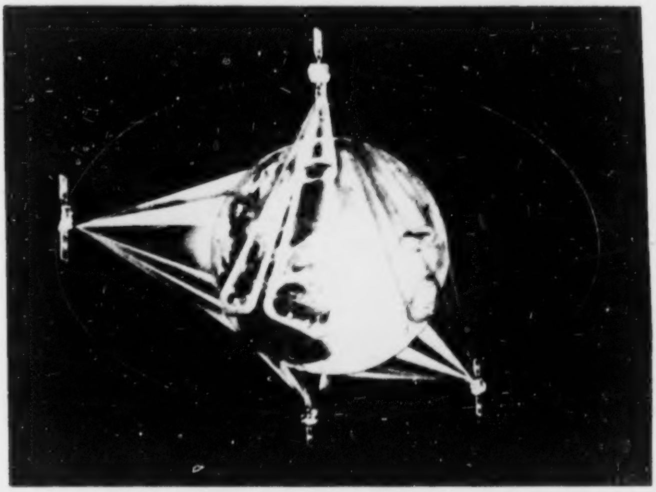
The Automatic Communications Processor program provides major improvements in high frequency (HF) radio communications equipment for timely and reliable communications in support of the worldwide mission of the Military Airlift Command. Modifications to airborne and ground radios will be developed that will improve the performance of conventional assets by adding an automatic frequency management system.

The Strategic Air Command's Automated Command and Control System relies on 30-year old technology. The current system is becoming increasingly difficult to support. It lacks the speed, capacity and routing architecture to meet the command's critical command and control requirements. The SAC Communications program includes the SAC Digital Network and the Aircraft Alerting Communications Electromagnetic Pulse upgrades.

The Strategic Air Command Digital Network (SACDIN) will replace the Data Transmission Subsystem of the command's Automated Command and Control system. Improvements include automated communications processors, linked together by the common-user Defense Data Network to meet SAC's requirements for high-speed message delivery. Production and fielding of SACDIN begins in FY 1985 with full operational capability scheduled for calendar year 1987.

The Aircraft Alerting Communications Electromagnetic Pulse (AACE) upgrade program will provide shielded enclosures and associated consoles and power supplies for selected equipment at Strategic Air Command main operating base command posts. In FY 1985, we are undertaking AACE full scale development and will conduct developmental test and evaluation. We plan to procure a total of 23 AACE production units in Fiscal Years 1986 and 1987 and install them during 1987 through 1988.

The Defense Satellite Communications System (DSCS) provides super high frequency satellite communications for secure voice and high data rate transmissions to support both defense and diplomatic users.



Defense Satellite Communications System (DSCS) III

In FY 1984 we initiated an expanded advance buy of parts for seven DSCS III satellites. In FY 1985 we received authority to increase the scope of this contract to a full multiyear production contract. The Fiscal Year 1986 budget request provides full funding for two of the seven satellites and continues advance procurement of the remaining five vehicles.

The EC-135 airborne command post provides an airborne operations center to support continued command and control of our nuclear forces. These aircraft, along with the E-4B, National Emergency Airborne Command Post aircraft, form the basis of the Worldwide Airborne Command Post system.

With the increasing age of the EC-135 Post Attack Command and Control System (PACCS) aircraft and the national emphasis on strategic communications capabilities, the Air Force has developed plans to modernize the aircraft. Additionally, we are currently conducting trade studies and preparing an acquisition plan for phasing in a replacement system.

Major modifications are planned for the EC-135 aircraft in Fiscal Year 1986. These modifications include continuing the ultra high frequency/frequency division multiplex replacement, the initial Milstar transition to satellite communications terminals and the Peacekeeper upgrades to Airborne Launch Control Center Aircraft. Other enhancements to be programmed in subsequent years include the full Milstar capability, Ground Wave Emergency Network terminals,improved Diversity Reception Equipment and installation of the Nuclear Detonation Detection System terminals.

Also in Fiscal Year 1986, we will begin installation of a Super High Frequency system upgrade for the E-4B Airborne Command Post aircraft. The E-4B will receive the initial Milstar modification as well as Nuclear Detonation Detection System terminals, Ground Wave Emergency Network terminals, and the Diversity Reception Equipment.

STRATEGIC DEFENSE

Strategic defense forces and systems are key elements of our deterrent posture. These forces form the backbone of our ability to warn of aircraft and missile attacks, monitor space activities, and defend against atmospheric and space-based threats to U.S. forces. They insure that our National Command Authority's strategic retaliatory capability would survive any Soviet attempt at a first strike by providing timely reliable, and unambiguous warning, as well as attack assessment and ultimately damage limitation.

Defense of North America against the air breathing threat is a joint U.S. and Canadian responsibility under the North American Aerospace Defense (NORAD) Command. Strategic air defense forces must provide timely, credible tactical warning and defense against enemy bombers, air-to-surface missiles and cruise missile attacks. These surveillance and defense forces control access to North American airspace in peacetime.

No longer is the Soviet air threat confined to high altitude bomber attack. Their capability has increased with the introduction and continued production of BACKFIRE bombers and improved air-to-surface missiles. New cruise missile-carrying BEAR bombers are being produced. In addition, a new strategic bomber, similar to but larger than our B-1B, called the BLACKJACK, is expected to become operational during the 1980s. It will also have a cruise missile capability.

More significant is the development and near-term deployment of cruise missiles. The Soviet air and sea launched cruise missiles are the most severe threat to our capability to insure adequate atmospheric tactical warning is provided to the National Command Authority. The modern threat has generated renewed interest in air defenses and the need for modernization.

Our planning for comprehensive modernization culminated in 1982 with a North American Air Defense Master Plan. This plan guided our acquisition strategy for fielding more capable air defense forces in the 1985-95 era. Under the lead of the NORAD commander, the plan was updated and a long-range planning annex completed. The master plan and annex provide guidelines for deployment of a modern air defense system.

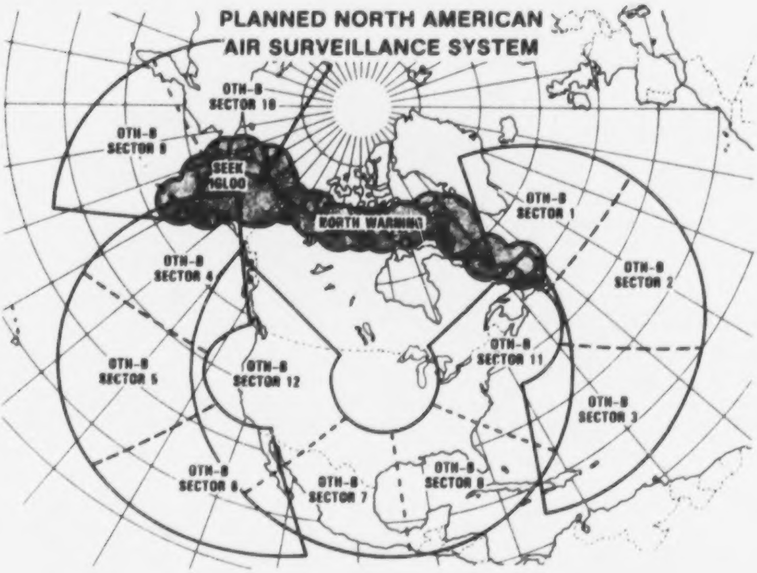
Most of our operational air surveillance and defense systems were designed and deployed in the 1950's to meet a medium-to-high altitude bomber threat. Over the years, force cut-backs have significantly reduced the number of our radars and interceptor aircraft. Against today's low-altitude bomber and cruise missile threat, the capabilities of these systems are limited to very short ranges. These systems are also becoming increasingly expensive to operate and maintain.

To warn of an air attack today, we have only the Distant Early Warning radar stations across northern Alaska, Canada and Greenland, the Joint Surveillance System radars around the periphery of the continental United States and some new radars in Alaska. We now have a modern command and control capability for these radars and fighter forces with the deployment of the Region Operations Control Centers.

New systems are being developed to overcome our current weaknesses. Dual emphasis has been placed on improving performance against the modern Soviet bomber and cruise missile threat and reducing the cost of ownership.

The Over-the-Horizon Backscatter (OTH-B) radar will correct many deficiencies of the current surveillance network. The OTH-B radar provides long range, all altitude, wide area surveillance. The Air Force plans to deploy four OTH-B radar systems. The East Coast system will provide surveillance of the Atlantic from the Labrador coast (where it links to the DEW line replacement, the North Warning System) to Florida. The initial sector of the East Coast radar system will be delivered to the Air Force in Fiscal Year 1986. The remaining two sectors will be delivered in FY 1987. In Fiscal Year 1986, we will begin procurement of the West Coast radar system to provide surveillance of the Pacific Ocean area from Alaska to Mexico. This system will be procured in Fiscal Years 1986 and 1987. The third OTH-B radar system will be located in the Central U.S. This system will link the East and West OTH-B radar systems. It will provide surveillance of the southern approaches to the United States and will cover Atlantic and Pacific Ocean areas inside the 500 mile minimum range of the East and West Coast systems. The fourth system will provide air surveillance of the North Pacific for air defense of the Aleutian Islands. The Central and Aleutian systems will be deployed in the early 1990s.

In the north, the existing line of Distant Early Warning (DEW) radar stations will be replaced to provide credible long range all altitude coverage to complement OTH-B surveillance. The 31 existing DEW Line radars are old, expensive to operate and maintain, and deficient in coverage and radar performance. The new system, called North Warning System, will consist of a total of 52 radar stations: thirteen long range, minimally attended radars and 39 short range, unattended radars. Upgraded communications to interconnect the radar stations and transmit data to the Joint Surveillance System Region Operation Control Centers is also part of the new program. Development of the new short range radar began in 1984, while production of the long range radar is continuing. Field deployment and site construction is being done under a new joint venture with Canada.


PLANNED NORTH AMERICAN AIR SURVEILLANCE SYSTEM

OTH-B SECTOR 10
OTH-B SECTOR 9
SEEK IGLOO
NORTH WARNING
OTH-B SECTOR 1
OTH-B SECTOR 2
OTH-B SECTOR 4
OTH-B SECTOR 11
OTH-B SECTOR 5
OTH-B SECTOR 12
OTH-B SECTOR 3
OTH-B SECTOR 6
OTH-B SECTOR 7
OTH-B SECTOR 8

In Fiscal Year 1986, communications upgrades will begin and development of the short range radar stations will continue. Both the OTH-B and NWS radars will provide a capability to detect and track long range cruise missiles.

Air defense surveillance to support our deployed forces outside of the Continental United States (CONUS) has become a major complementary effort to North American defense. In Fiscal

Year 1986 we will continue to enhance radar surveillance and command and control in the North Atlantic region as a part of the Surveillance Radar Station/Sites Program. We will also begin improvements to our capability for air surveillance in the Caribbean region.

Beyond 1990, the emphasis in air surveillance will be the deployment of survivable systems to meet the growing Soviet threat. In Fiscal Year 1986, the Air Force will continue development of the critical technologies applicable to airborne, ground-based, and space-based sensors for an advanced air surveillance system that will meet this evolving threat. In the Missile Surveillance Technology and Atmospheric Surveillance Technology programs, we are emphasizing feasibility demonstration of concepts for wide area detection of advanced aircraft and cruise missiles through all phases of conflict. These efforts support the recently completed long-range plan for strategic air defense formulated by the commander of the North American Air Defense Command.

The program to modernize our Strategic Air Defense capability includes adding F-15s and F-16s. With its long-range radar and look-down, shoot-down capability, the F-15 will substantially improve our air interceptor force. The F-16 will replace the aging F-106s and be used by the Air National Guard for strategic defense. We will use the E-3A Airborne Warning and Control System (AWACS) to ensure survivable surveillance and to meet command and control requirements for the air interceptor forces.

F-15 Air Defense Fighter

Fifteen air defense interceptor squadrons will continue to maintain ground alert at sites around the periphery of the continental United States. Alert aircraft are employed, in response to radar detections, to intercept and to visually identify unknown intruders. Supported by AWACS aircraft in crises or wartime, these forces provide a limited defense of the continental United States.

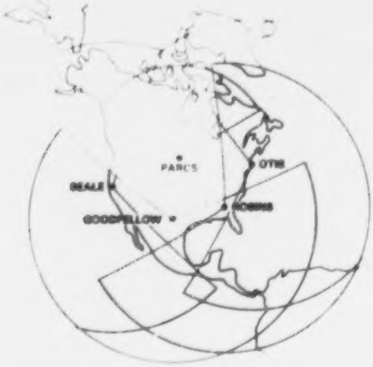
By the end of FY 1988, F-15 and F-16 aircraft will have replaced the remaining F-106 aircraft in the active duty interceptor squadrons. This will result in an air defense force composed of four active and eleven Air National Guard squadrons. These improvements will greatly enhance the defense against bomber and cruise missile attacks.

A network of sensors provide our National Command Authorities with ballistic missile attack warning and assessment. These sensors include space satellite systems; Ballistic Missile Early Warning System sites in Alaska, Greenland, and the United Kingdom; the Perimeter Acquisition Radar Attack Characterization System (PARCS) radar in North Dakota; sea launched ballistic missile detection and warning sites (PAVE PAWS) in Massachusetts and California; and the AN/FPS-85 and AN/FSS-7 submarine launched ballistic missile detection radars in Florida.

These systems provide warning of missiles launched from all fixed-site Soviet intercontinental ballistic missile launch areas and areas historically patrolled by ballistic missile submarines in the northern hemisphere. However, Soviet ballistic missile capabilities have improved to the point that we must upgrade our existing BMEWS radars and deploy new Sea Launched Ballistic Missile (SLBM) warning systems to insure adequate coverage and meet the modern, multiple reentry vehicle long range threat. Several modernization efforts are in progress to give us the capability we need.

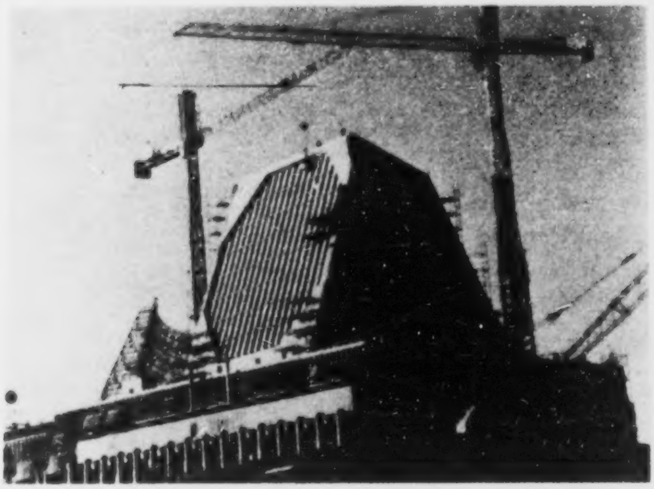
To accomodate the increased Soviet sea launched ballistic missile threat, two new PAVE PAWS radars are now under construction in the southeastern and southwestern United States. When these sites become operational, they will join the existing Northeast and Northwest PAVE PAWS radars and the Perimeter Acquisition Radar Attack Characterization System in North Dakota to form a five site phased array SLBM radar-warning network. This network will provide 360 degrees of warning coverage around the United States, and also allow us to close the older, less capable AN/FPS-85 and AN/FSS-7 SLBM radars currently in use.

SLBM RADAR WARNING SYSTEMS



In Fiscal Year 1986, efforts will continue on these new PAVE PAWS radars at Robins Air Force Base, Georgia and Goodfellow Air Force Base, Texas. Warning capability improvements will be added to the existing PAVE PAWS radars at Otis Air Guard Base, Massachusetts and Beale Air Force Base, California in FY 1987. Satellite tracking capabilities will also be added to the Robins site.

The Ballistic Missile Early Warning System (BMEWS) modernization program is replacing existing 20 year old conventional radars at the Thule AB, Greenland, site with a new solid-state phased-array radar. The new system will become operational in late 1986. This will improve system performance and capacity and provide better pre-impact assessment. In Fiscal Year 1986, we will also begin a similar modernization at the Fylingdales, England BMEWS site.



BMEWS Site

Our current space surveillance system is composed of three Ground-based Electro-Optical Deep Space Surveillance (GEODSS) stations and a number of dedicated and contributing radar stations. Against today's threat these systems must be upgraded to provide improved low-altitude coverage, high-altitude detection, and an ability to report space events in a timely manner. The current command and control functions provided by the North American Aerospace Defense Command Combat Operations Center are essentially manual and require improvements to support timely coordinated responses to potential military conflicts.

Our space surveillance and space defense programs will improve surveillance, increase survivability, develop an antisatellite system and enhance selected C^3 elements.

The SPACETRACK program will improve our ability to monitor space activities. Surveillance is the key to our warning and defensive options, and we are pursuing several near-term efforts to upgrade that capability in our SPACETRACK program. In Fiscal Year 1986, we will begin testing at the GEODSS site in Diego Garcia; that site will become operational in FY 1987. The five-site GEODSS system providing global deep space surveillance will be completed in FY 1988. We also plan to improve SPACETRACK by refurbishing radar sensors and improving radar calibration for support of our future anti-satellite system.

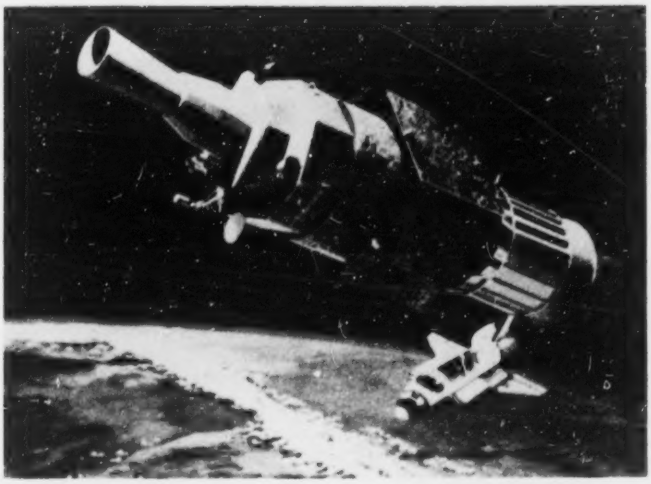
For the far term, our space surveillance advanced development efforts are meshed with the President's Strategic Defense Initiative (SDI). The Air Force goal is to deploy by the mid-1990s, a survivable space surveillance and tracking system which will provide full earth orbit coverage, reduce dependence on overseas basing of sensors and provide timely, operationally responsive coverage of objects and events in space. These Air Force surveillance requirements are incorporated into the SDI technologies development plan. When the technology has matured in the SDI program, it will be transferred to the Air Force and a system will be developed and deployed.

The Space Defense System program continues to develop a low-altitude, air-launched miniature vehicle antisatellite system. The primary purposes of a United States antisatellite (ASAT) capability are to deter threats to space systems of the United States and its Allies and, within such limits imposed by international law, to deny any adversary the use of space-based systems that support hostile military forces. We plan to initiate low rate initial production in FY 1985 and continue production in Fiscal Year 1986 with the purchase of the second lot of ASAT missiles.

Command, control and communications are vital to effective integration, coordination and management of all space defense resources. The North American Aerospace Defense Cheyenne Mountain Complex Space Defense Systems program will develop the Space Defense Command and Control System in a phased approach to support the evolving space defense elements. During Fiscal Year 1986, the Space Defense Operations Center phased development will continue. An automated capability is being developed to support our space surveillance and space defense program.

The Defense Support Program (DSP) is a key element of our nation's strategic defensive posture. This program provides data to the National Command Authority, North American Aerospace Defense Command, and Strategic Air Command. Our development efforts are aimed at increasing the survivability of operational data through design of ground station modifications. These stations will be made compatible with the survivability improvements of follow-on satellites.

To meet near-term requirements, four DSP satellites have been procured, two in FY 1983 and two in FY 1984. In Fiscal Year 1986, we will take delivery of the first of these satellites and continue integration of DSP satellites with the Space Shuttle and continue ground station compatibility modifications. In addition, we will complete testing on all mobile ground terminals.



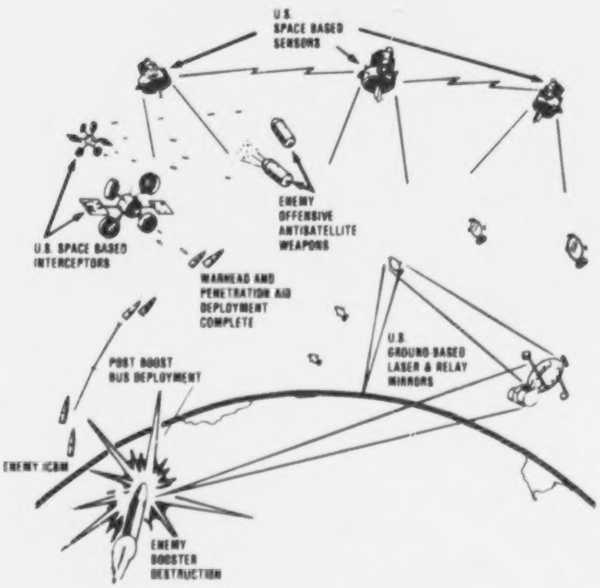
Defense Support Program Satellite

STRATEGIC DEFENSE INITIATIVE

President Reagans's Strategic Defense Initiative (SDI) calls for a vigorous research and technology program to provide a thorough technical basis to support a future decision that could lead to a defensive system to counter the ballistic missile. Following the Presidents March 23, 1983 speech, the Department of Defense (DOD) initiated a study (the Defensive Technologies Study) to define a long term research and technology development program to explore the key technologies needed for an effective multitiered ballistic missile defense. The goal of the research program is to develop a base of proven technology that can lead to a defensive system that will destroy Soviet ballistic missiles during the various phases of flight (boost, post-boost, midcourse, and terminal).

Based on the recommendations of the Defensive Technologies Study, the DOD created a new defense agency in April 1984, the Strategic Defense Initiative Organization, to carry out the President's long term research and technology program in Strategic Defense. The initiative is focused on technology development in five areas: Surveillance, Acquisition, Tracking and Kill Assessment; Kinetic Energy Weapons; Directed Energy Weapons; Battle Management/Command, Control, Communications (C^3) and System Analysis and Supporting Technologies (Lethality, Survivability, Space Prime Power, and Space Logistics).

A CONCEPTUAL STRATEGIC DEFENSE


U.S. SPACE BASED SENSORS
U.S. SPACE BASED INTERCEPTORS
ENEMY OFFENSIVE ANTISATELLITE WEAPONS
WARHEAD AND PENETRATION AID DEPLOYMENT COMPLETE
U.S. GROUND-BASED LASER & RELAY MIRRORS
POST BOOST BUS DEPLOYMENT
ENEMY ICBM
ENEMY BOOSTER DESTRUCTION

The Air Force was asked by the Strategic Defense Initiative Organization (SDIO) to execute approximately 40% of the program in the 1985-1990 timeframe. We receive funds and technical and programmatic guidance from the SDIO, develop execution plans, and carry them out. The Air Force Systems Command, through its laboratories and two major product divisions, Electronic Systems Division, and Space Division, will award contracts and manage SDIO directed programs.

In FY 1985, several ongoing Air Force programs have been integrated into the Strategic Defense Initiative. The most notable are the Advanced Warning System (now Boost Surveillance and Tracking System), the Space-Based Space Surveillance System (now Space Surveillance and Tracking System), and the Strategic Laser Technology Program (now part of Directed Energy Weapons). These programs will be conducted under the Strategic Defense Initiative to meet the broader range of requirements of ballistic missile defense while also meeting the currently validated tactical warning/attack assessment and space defense requirements. We are also heavily involved in the Battle Management and C^3 and Supporting Technologies Program. During the 1980s, we will pursue experiments and demonstrations to assess the feasibility of the applicable technologies and to support development decisions in the 1990s. By pursuing a vigorous research and development program consistent with the Anti-Ballistic Missile Treaty, the United States can be in a position in the early 1990s to make an informed decision whether or not to enter full scale development of selected systems. Development of these systems will potentially lead to an effective defense against ballistic missiles for the U.S. and its allies.

SECTION III

SPACE OPERATIONS

Space systems have become an integral part of our military forces. They directly support both strategic and conventional forces by providing global data from space for defense missions. Spaceborne surveillance warning, communications, meteorological and navigation systems significantly increase the effectiveness of our forces today and we fully expect these spaceborne capabilities to become even more important to our forces in the future. (The contribution of specific space systems to strategic C^3 and strategic defensive forces is covered in detail in Section II.)

The Soviets have long known the military utility of operating in space and have committed significant resources toward a sizable space presence. The Soviet space program is under complete control of the military establishment. Moreover, the Soviets have spent great sums to develop a robust space presence that supports specific military and political objectives and provides options for space initiatives that could significantly modify their strategic posture in relation to the U.S.. The Soviets today have the only operational anti-satellite weapon and continue to develop the most extensive and flexible launch capability in the world.

In July 1982, the President issued a new National Space Policy directing a balanced civil and national security space program. As part of the national security space program, the Air Force established the Air Force Space Command, a new major command to centralize and focus its space activities. In November 1984, the President further authorized a new Unified Command, U.S. Space Command, with participation of all four armed services. The Air Force objectives in space include: pursuing a vigorous research and development program to give us future options in space; expanding to space those functions that can be better accomplished there; and developing an anti-satellite system to assure our free access to space and to deter Soviet attacks against our satellites in orbit.

Our plans for space include: making our space systems (the satellites, the ground stations, and the communications links between them) more survivable from attack; improving the surveillance, communications and navigation capabilities of our space systems; and increasing the robustness of our space system network by removing single nodes, procuring backup satellites, and reducing our dependency on overseas ground stations.

In addition, we are concentrating our efforts on doing more with each launch by deploying satellites with the capability to perform multiple missions and with much longer operational life. To optimize our deployment and on-orbit performance, we are evaluating alternate space launch capabilities, improving our space operations capabilities, and aggressively pursuing advanced, space related technology.

To support U.S. space operations, an infrastructure of Launch and on-orbit control facilities is required; and survivability of that infrastructure is a critical part of our planning and development activity.

The Space Transportation System (STS) is the national program for providing U.S. Government and commercial users, as well as foreign users, routine access to space. The STS consists of the Space Shuttle, launch and landing facilities, mission control facilities, upper stages and Spacelab. The National Aeronautics and Space Administration (NASA) is responsible for developing and operating the Shuttle.

The Air Force is the Department of Defense executive agent for military applications of the Shuttle. We are responsible for: acquiring and operating the Shuttle launch site at Vandenberg Air Force Base; acquiring and operating both the dedicated military control center and the Consolidated Space Operations Center; developing the Inertial Upper Stage (IUS); and jointly developing with NASA a common Centaur G upper stage.

Space Shuttle

Construction of the Vandenberg Air Force Base launch facility is progressing on schedule for a launch readiness date of October 1985. "Discovery", the first space shuttle orbiter to use the facility will begin preparation in September of 1985. NASA's recent problems with the Space Shuttle's insulating tiles and development delays related to new lightweight casings for the Shuttle's Solid Rocket Boosters, will delay the first launch to not earlier than 29 January 1986.

Work has continued to resolve the IUS flight anomaly that occurred on the NASA sponsored Tracking and Data Relay Satellite (TDRS) launch in April 1983. We identified the problems, made design corrections and thoroughly tested the IUS to ensure it is flight-ready. Normal launch operations were resumed in January 1985.

The Space Launch Support program funds Department of Defense Shuttle operations including those at Vandenberg Air Force Base, the orbiter flight charge reimbursements to NASA, and procurement of the Centaur G, IUS, and Payload Assist Modules Delta Class II (PAM-D II) upper stage vehicles. For geostationary orbits, the Centaur G supports 10,000 pound class payloads, the IUS 5000 pound loads and the PAM-D II 3000 pound loads.

In Fiscal Year 1986, procurement funds are required to continue the PAM-D II multiyear procurement in support of the Navstar GPS program. Funds will be used to modify IUS vehicles to correct the previously mentioned flight anomaly, to fully fund three FY 1985 advance procurement IUS vehicles, and to provide logistics support for the IUS and the Vandenberg launch site.

The 1986 request will continue funding for a Centaur G vehicle initiated in FY 1985. We will also seek to acquire another Centaur G vehicle to be funded incrementally in Fiscal Years 1986, 1987 and 1988 with the Research, Development, Test and Evaluation appropriation. These two vehicles will be used to launch Milstar research and development satellites. The Fiscal Year 1986 request will also fund the Manned Spacecraft Engineer (MSE) program and support secondary payloads that will fly on the space shuttle.

Under the Space Boosters Expendable Launch Vehicle (ELV) program, we currently acquire and launch Titan III (34)D and refurbish and launch Atlas E ELVs. In 1984, we ordered the last Titan III(34)D ELV while the majority of our satellites transition to the Shuttle. Our last Titan III (34)D is scheduled for launch in FY 1988, and our last Atlas E will be launched in FY 1990. Additionally, we are implementing the President's guidance set forth in the National Space Policy to provide a limited number of ELVs to complement the Space Transportation System (STS). This capability is critically needed to satisfy two specific requirements--the need for a launch system complementary to the STS as a hedge against unforeseen technical and operational problems and the need for a launch system suited to operations in crisis situations. We plan to begin in FY 1985, and continue through 1986, the upgrade of an ELV system capable of launching Shuttle-sized satellites. We plan to initiate production of 10 ELVs in 1986. The initial launch capability is required in late 1988. Further, in Fiscal Year 1986, we will begin development efforts to upgrade the deactivated Titan II Intercontinental Ballistic Missiles into a space launch vehicle configuration.

We plan to use Titan II assets to launch a limited number of smaller satellites including the Defense Meteorological Satellite Program satellites.

The Air Force provides on-orbit control for Department of Defense satellites from the Satellite Test Center (STC) at Sunnyvale Air Force Station, California, through a worldwide network of seven geographically-dispersed tracking stations. The current computer system in the Satellite Test Center is costly to maintain and becoming logistically unsupportable. Furthermore, it is incapable of supporting new, more sophisticated satellites now in development.

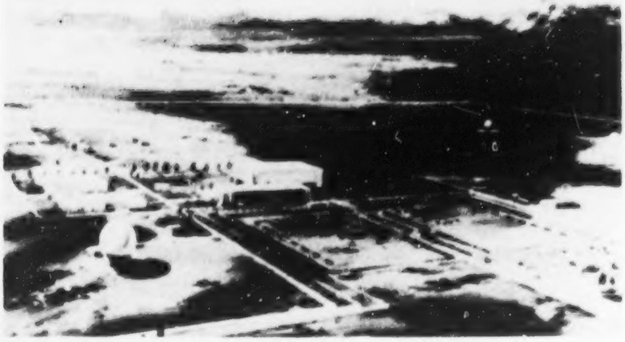
In Fiscal Year 1986, we will continue development and acquisition of the Satellite Control Facility (SCF) Data System Modernization program, which will correct operational limitations and form the core configuration for operations at both the Satellite Control Facility and the Consolidated Space Operations Center. As the Consolidated Space Operations Center is developed, the data systems modernization computers will be installed there to provide internetting with the SCF.

Fiscal Year 1986 funds will also continue development and acquisition of the Advanced Remote Tracking Station to replace or refurbish the existing remote tracking stations and complement the Data System Modernization.

Our Fiscal Year 1986 request is needed to continue work on the new Consolidated Space Operations Center (CSOC). The CSOC will provide efficiencies (management, operational and economic) by combining two major space missions for the Department of Defense satellite control and Space Shuttle military operations. The CSOC Satellite Operations Complex will share part of the satellite control workload with the Satellite Test Center. A Shuttle Operations and Planning Complex will provide Shuttle flight planning and readiness support and conduct Shuttle mission operations for DOD flights.

The CSOC Satellite Operations Complex will provide greater mission capability and flexibility as well as increased survivability. The Satellite Test Center and the CSOC will provide mutual emergency backup for mission essential functions should outages occur at either center.

From the CSOC Shuttle Operations and Planning Complex, we will plan and control the Department of Defense shuttle missions, and provide enhanced security protection. Until the complex becomes operational, control of Department of Defense Shuttle missions will be performed by the NASA Shuttle control facility at Johnson Space Center. Once CSOC becomes operational, Johnson Space Center will serve as the backup to CSOC for Department of Defense missions. The two control facilities will thus increase Shuttle survivability.



Consolidated Space Operations Center

In Fiscal Year 1986, the CSOC buildings and other site facilities will be completed. RDT&E and procurement funds will continue acquisition of technical systems for satellite and Shuttle control, network communications, operations command center, and support training programs. Hardware to initially support the Satellite Operations Complex portion of CSOC will be installed to allow the start of satellite operations in FY 1987.

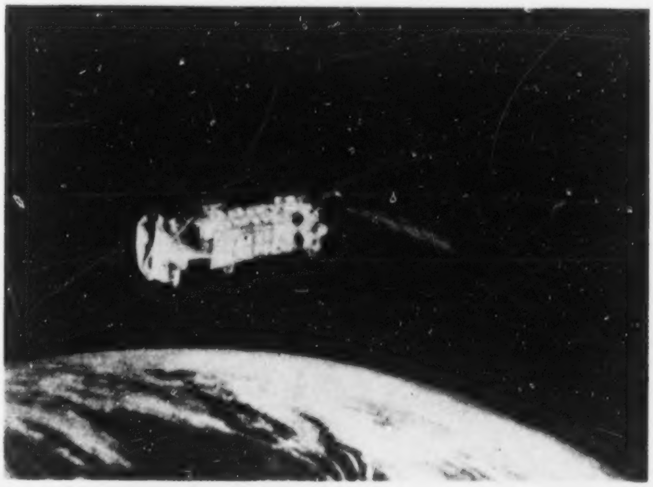
We are committed to maintaining the technical superiority of our space systems. The key involves testing new concepts and investigating the effects of the space environment on our systems and our personnel. The tri-service Space Test Program supports this objective by providing spaceflights for Department of Defense experiments that gather information critical to the development of future space systems, including development of the Shuttle as a manned space laboratory. Fiscal Year 1986 funding supports the spaceflight of four primary experiment missions and 15 secondary payloads, including some to be performed on the Shuttle.

Exploiting space in the future requires a flexible and responsive deployment system. The Advanced Military Spaceflight Technology research program is intended to clarify the alternatives for a possible future earth-to-space sortie vehicle which can ascend into space, maneuver and return for an airfield landing. We intend to perform concept and utility analyses in Fiscal Year 1986, leading into technology development in later years. Technical feasibility and costs can then be estimated to provide the background required for program decisions.

U.S. space systems significantly enhance the effectiveness of our ground forces. The global coverage and critical near realtime information that satellites provide are becoming increasingly important. In fact, many of the tasks performed by our satellites can only be done effectively from space.

Three Air Force space programs, the Defense Meteorological Satellite Program, the Navstar Global Positioning System, and the Nuclear Detonation Detection System are unique in their support of a broad spectrum of missions for the Department of Defense.

The Defense Meteorological Satellite Program (DMSP) is the Department of Defense's single most important source of weather data. The program is a joint service program with the Air Force serving as executive agent. DMSP provides total earth coverage of meteorological, space environmental and oceanographic data to Air Force and Navy forecasting centers. In addition, it directly transmits realtime local meteorological and oceanographic data to Air Force and Marine Corps transportable terminals and Naval carrier based stations.

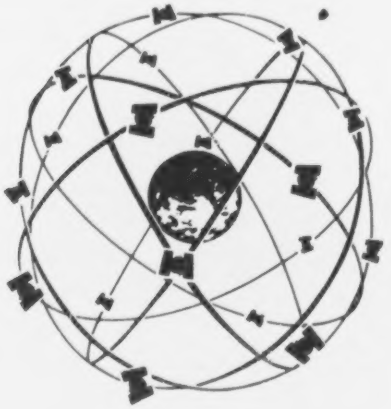


Defense Meteorological Satellite

The major DMSP Fiscal Year 1986 effort will be the continued design and development of an upgraded imaging sensor and the initial development of the associated Titan II Space Launch Vehicle qualified spacecraft. Production of new advanced mobile tactical transportable weather terminals for the Air Force and Marine Corps will continue. Further, the Satellite Control Facility antenna system at the Thule AB, Greenland tracking station is being improved to receive and transmit DMSP command and control and data signals.

The Navstar Global Positioning System (GPS) is a space-based radio navigation system which will provide Joint Service users highly accurate three-dimensional position, velocity and precise time under all-weather conditions on a worldwide basis. When fully operational at the end of 1988, GPS will enable land, air, and sea forces to navigate with extremely high accuracy and be independent of limited-range terrestrial-based navigation aids. GPS will significantly improve the probability of target acquisition, low-level navigation to and from the target, flexible routing and, most importantly, the accuracy of weapons delivery. In addition, a civil version of GPS will also be available for worldwide civil use. The GPS system includes a space segment, a control segment, and user equipment. Successful development led to the award of a multiyear production contract for 28 satellites in FY 1982.

NAVSTAR GPS
6 PLANE 18 SATELLITE CONFIGURATION



In Fiscal Year 1986, we are requesting funds to continue the GPS multiyear contract. Those funds will be used to complete the purchase of nine satellites and continue advance procurement funding for the remaining 12 satellites. The first GPS production satellite launch is planned for late 1986. We will also initiate deployment of the user avionics, which will ultimately be installed in most Department of Defense aircraft. Also included is the continued funding of the five-satellite research and development constellation to support mapping, missile testing and avionics integration testing.

The Nuclear Detonation Detection System (NDS), also known as the Integrated Operational NUDET Detection System (IONDS), consists of a set of sensors that will be carried on Navstar GPS satellites. When used with the precision frequency standards of the GPS, these sensors will determine nuclear detonation location, time and yield.

Prototype sensors are operational on three GPS developmental satellites. In Fiscal Year 1986, we will continue development of the NDS user terminals and acquisition of the operational satellite segment. A full NDS capability will be achieved in 1988 when the GPS satellite constellation is in place.

SECTION IV

READINESS AND SUSTAINABILITY

Air Force investment in force structure and modern weapon production may be translated into a warfighting capability only if readiness and sustainability programs are functioning well. Success in combat requires a blend of modern equipment, well trained people, effective repair facilities, sufficient spare parts and adequate munitions and fuel.

Ready forces, on hand, form the basis of our capability to engage the enemy effectively on the first day of fighting. Readiness is the sum of proficiency and sufficiency, in forces, units, weapon systems and equipment. Readiness requires that forces be trained under realistic conditions and stocks of spares be available at the beginning of combat.

Sustainable forces, on the other hand, must have the "staying power" to fight during and beyond an initial period of combat. To do that, they depend on the nation's ability to generate adequate spares, supplies, munitions and fuel to replace those resources consumed or attrited in battle. Moreover, sustainability results only when peacetime stocks, the support infrastructure, war reserve materiel and the industrial base permit it.

Air Force materiel inventories are split into categories: peacetime operating stocks and prepositioned wartime assets. The categories equate to those "readiness" kinds of spares and equipment needed at the outbreak of war; and prestocked wartime requirements, which support "sustainable" fighting and depend on deeper stock levels and industrial surge.

Since 1981 the Air Force has sought to reduce serious shortfalls in wartime stocks and at the same time keep the forces ready. This emphasis has brought tangible results.

Today, our combat aircraft can fly over 60 percent more combat sorties in NATO than they could in 1980 and do so with more capable airframes. Further, an increase of 50 percent in the defense budget for sustainability programs between FY 1982 and FY 1984 will result in an increase of over 80 percent in the number of sorties which can be optimally supported with munitions between 1983 and 1986.

We are proud to report that, with 1985 appropriations, our spare parts inventories are healthier than they have been in years. The availability of spare parts is perhaps the best quantifiable indicator of Air Force readiness and sustainability. Our Fiscal Year 1986 budget continues a level of spares funding that will further enhance our ability to fight for sufficient periods of time.

AIRCRAFT AND MISSILE SPARES AND REPAIR PARTS

Peacetime Operating Stocks are those spares and repair parts that support the readiness objectives of the Air Force. They are needed for combat forces training, continuation of day-to-day operations and assurance that our weapon systems can perform wartime missions if required. Peacetime requirements have continued to remain our highest spares funding priority. For now we have sufficient spares to maintain a ready force and we plan to keep it that way.

The serious pre-1981 shortfalls in war reserve materiel had been created by reduced defense budgets and the critical need to increase and modernize systems. Fortunately, improved funding priorities and the application of innovative management since then have reversed the trend.

War reserve stocks and inventories are created to satisfy wartime requirements. We categorize these materiel requirements into two categories. The first, War Readiness Spares Kits (WRSK) and Base Level Self-Sufficiency Spares (BLSS) are provided to support initial combat operations but are only designed to carry us through the initial stages of conflict. A second category of reserves, Other War Reserve Materiel (OWRM) provides the sustainability needed until the industrial base can react.

In FY 1985, the Air Force sought to take care of as many war reserves as possible, particularly in support of airlift forces. Based on the recommendations in our Airlift Master Plan, we determined that our mobility forces needed the most support. As a result, we are currently programming war reserve requirements for all airlift support. At the same time, we were able to fund WRSK/BLSS for Air Force aircraft and support most of our long-term OWRM needs. This was made possible not only because of solid funding support but because our spare parts acquisition improvements initiatives (discussed in Section VII) are beginning to yield dividends. The reforms in spare parts acquisition produced savings which were invested in war reserve spares.

The Fiscal Year 1986 request will continue to place an emphasis on the funding of peacetime and war reserve spares. At the same time, we seek a continued position of strength which is both ready and sustainable. Our spares procurement consists of two distinct elements--initial spares and replenishment spares.

Initial spares include items unique to a weapon system for support of early operations of newly-delivered aircraft and missiles. The account also funds spare engines, initial support for simulators, modifications and ground support equipment. Included in this fiscal year's request are spare engines for F-15 and F-16 fighter aircraft, the cornerstones of our tactical forces. In addition, our Fiscal Year 1986 request includes emphasis on the B-1B strategic bomber, the Peacekeeper strategic missile and the C-5B transport aircraft.

The second element, replenishment spares, is required to provide continuing support throughout the life cycle of a system. Adequate funding of replenishment spares for our aircraft and missile forces is vital to peacetime readiness and wartime sustainability.

Because of the two year average leadtime to procure spares, the Fiscal Year 1986 budget request for aircraft replenishment spares will provide peacetime spares to support the FY 1988 flying hour program. In addition, the budget provides new and updated war readiness kits. There have been improvements in our sustainability in 1985, and this request continues the trend. Replenishment spares are required to adequately support strategic airlift and tactical forces.

Our missile spares and repair parts have received an adequate level of funding for the past several years. As a result, high mission capable rates continue. Continued Congressional support is vital to the progress we have made in upgrading logistics support to our missile forces and in maintaining the high mission capable rates.

Readiness and sustainability are the products of continued support for a great many kinds of requirements. Many of these, which include such items as munitions, bare base equipment, vehicles, fuel, other procurement equipment spares and repair parts, depot maintenance and military construction, are reflected in other appropriations. In addition to spares and repair parts, those items controlled within the budget categories under consideration include: simulators and trainers, modifications, war consumables and aircraft common ground equipment.

SIMULATORS AND TRAINERS

Combat effectiveness and peacetime readiness require rigorous, realistic training if aircrew members are to exploit the full potential of their weapon systems. Through extensive use of combat simulators, the Air Force is able to supplement and complement actual sortie training. Simulation training and exercise missions yield enhanced combat capability and improved safety.

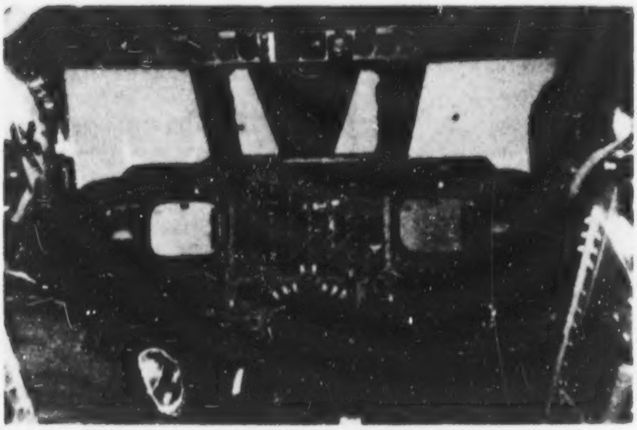
Mission readiness through more efficient and effective training is the most important return we expect from modern simulator investments. Simulators are also used to train safety-of-flight tasks, such as emergency procedures, that require flight conditions that are difficult or not prudent to accomplish in the aircraft. Also, we use simulators to train those warfighting tasks that are not easily exercised in the aircraft because of equipment, range, or airspace limitations. In this way, simulators complement the kinds of training that can only be performed in-flight.

The right combination of flight simulators and aircraft will produce: better combat readiness of experienced aircrews; initial and continuation training for less experienced aircrews; and conservation of costly weapon systems resources. This equates to more proficient aircrew members and lower airframe and aircrew loss rates in wartime.

We currently have simulators for most weapon systems, including the F-15, F-16 and A-10 fighter aircraft; C-5, C-141 and C-130 transports; KC-135 and KC-10 tankers; T-37 and T-38 trainers; B-52 bomber and E-3 Airborne Warning and Control System. Technological improvements to the force and the introduction of new systems, however, create a need for continued support for simulators.

In FY 1985, we procured the C-5 and C-141 aerial refueling part task trainer, the B-1B Weapon System Trainer (WST), and a second EF-111A Operations Flight Trainer. We also began development of a simulator subsystem for the Low Altitude Navigation and Targeting Infrared System for Night (LANTIRN), a part task trainer for the GBU-15 glide bomb, a simulator for the T-46A trainer aircraft and a Weapon System Trainer for the F-15E (Dual Role Fighter). This development will continue in the coming Fiscal Year 1986.

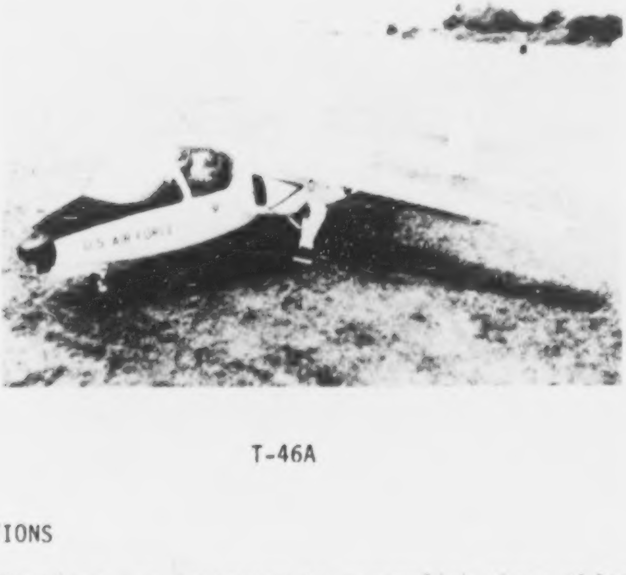
The Fiscal Year 1986 budget request will continue procurement of Operational Flight Trainers for the F-15 and F-16, the C-5B aircrew training system, and the B-1B WST and mission trainers. We also begin development of the HH-60A/WST and C-17 training system.



Pilot's Portion of the
B-52 Weapons System Trainer

The Air Force plans to continue its flight simulator program for new systems such as the C-17 and the Advanced Tactical Fighter and upgrade existing systems to extend their useful lives and improve supportability.

The Air Force T-37 jet trainer is now 26 years old and operationally deficient. To meet our pilot training requirements without degrading quality or the amount of training, we are replacing the T-37 with the T-46A. The T-46A will have twin engines, side-by-side seating and a pressurized cockpit. It will perform better than the T-37, be more maintainable, and have reduced engine noise. We are requesting funds to procure 33 aircraft in our Fiscal Year 1986 budget request.



T-46A

MODIFICATIONS

Modifications are necessary to accomplish three things: improve reliability and maintainability and increase service life, improve capability and improve safety.

In Fiscal Year 1986, we are requesting $2,917.8 million for modification of in-service aircraft. The Air Force is retaining aircraft longer than ever before with the average age of the inventory approaching 16 years by the end of 1986. This contributes to the large amount required for modifications because the longer retention generates a requirement to extend the service life beyond the original design. The 1986 budget request contains funds for structural modifications to the C-130 wing, the C/KC-135 wing and various structural areas of the F/RF-4 aircraft. In addition, the budget would initiate a Service Life Extention Program on the H-53 and the T-38 aircraft.

Together with structural deterioration, electrical and electronic systems degrade over time. There are tube-type avionics components that require replacement to maintain a reliable, supportable configuration on the older aircraft. Current technology provides solid state, digital hardware to replace this unsupportable hardware. It also provides a significant improvement in our peacetime materiel readiness and safety of the aircraft while also decreasing support costs after installation. Upgrade to the B-52 and RF-4C radars, replacement of the C/KC-135 autopilots, F/FB-111 avionics modernization and numerous common systems such as radios, radar altimeters and air data computers are some of the many modifications underway to solve supportability problems and improve operational readiness through an improved reliability.

The major improved capabilities for which funds are requested in Fiscal Year 1986 include improved Electronic Warfare Equipment for the B-52 and F-4E, Modernization of the KC-135 with the new CFM-56 Engine, procurement of the common strategic rotary launchers for internal carriage of the ALCM on the B-52, a Self Contained Navigation System for the C-130, HAVE QUICK "A" Nets for improved anti-jam communications on the E-3A, and Cargo Convertibility for the Civil Reserve Air Fleet.

WAR CONSUMABLES

War Consumables are expendable items directly related and absolutely necessary to a weapon/support system or combat/combat support activity. An example would be those aircraft equipment items which can or must be jettisoned during combat to reduce drag, increase speed and improve maneuverability. War consumables include such equipment as external fuel tanks, fuel and weapons pylons, bomb racks and missile launchers. Also considered consumables are the adapters that mate these items to aircraft. As a general rule, items funded in this category are stored, controlled, and maintained as War Reserve Materiel. The inventory requirements are dependent on factors such as tactics, aircraft sortie rates and expected combat expenditure per sortie factors.

In Fiscal Year 1986, we plan to continue filling War Reserve Materiel requirements for the F-16 aircraft's 370-gallon wing tank and pylon, for the LAU-117 single-rail Maverick missile launcher used on various tactical aircraft and for the electronic adaptor unit for the LAU-88 triple rail Maverick missile launcher.

This budget request also completes requirements for the High Speed Antiradiation Missile launcher (LAU-118) for the F-4G Wild Weasel aircraft.

AIRCRAFT COMMON GROUND EQUIPMENT

Common ground equipment is that used on the flight line, in base maintenance shops and at centralized maintenance activities. Without these mission-support items, we could not rapidly launch, maintain, service or test aircraft and their components. The items include compressors, munitions trailers, hydraulic test stands and noise suppressors.

The Fiscal Year 1986 budget request provides common support equipment for new aircraft entering the inventory and for replacement equipment. War Reserve Materiels are needed for the support of rapid force deployments. Steady, incremental growth is essential in this area of readiness.

SECTION V

FORCE PROJECTION

AIRLIFT

One of the time-honored principles of war states that firepower must be available to forces within the area of combat. A combat unit, however well trained or equipped, cannot influence a conflict's outcome without the means to fight at the time and at the place the battle must be fought. Our nation's military strategy depends on a mix of U.S. based and forward deployed forces. All mobility forces, airlift, sealift and prepositioning, serve as the link between our force structure and its combat capability. Together they provide the means to rapidly project and sustain a balanced military fighting force on a global scale.

Although all three types of mobility forces complement one another and perform necessary wartime missions, only airlift can respond to time-sensitive situations. Despite its inherent volume limitations, airlift is faster, more flexible and less vulnerable than either sealift or prepositioning.

The importance of these capabilities--and the present deficiencies which prevent optimum mobility--have been documented numerous times in studies since 1974. The 1981 Congressionally Mandated Mobility Study urged establishment of a minimum, fiscally-attainable intertheater airlift goal of 66 million ton-miles per day. That standard became the basis for the Airlift Master Plan, which directs our airlift acquisition strategy.

The Soviet Union has placed priority on building its projection forces. Buildup of a blue-water navy and the expansion of long-range airlift are but two indicators of their intentions. The threat involves not only a direct threat to the United States and our allies but an ability to influence events in the Third World. Indirect intervention, transfer of weapons and the encouragement of surrogates are of equal concern. NATO force deployments are dependent on speed due to the short warning time that might occur prior to an attack on Western Europe. Conflicts that might occur between the U.S. and Soviet Union may involve areas of confrontation that are geographically dispersed. If we must operate in widely-separated theaters, airlift forces remain indispensable to our ability to respond.

The Fiscal Year 1986 budget request continues a measured growth in our effort to achieve the airlift master plan goals. In FY 1984, favorable funding permitted an increase to our intertheater airlift capability of about two million ton-miles per day. This five percent increase reduced the shortfall to 26 million ton miles per day. This remaining shortfall must be eliminated if Congressionally mandated targets are to be met.

The Air Force Airlift Master Plan provides for increasing airlift capability through acquisition of the C-5B, KC-10, and C-17 as well as enhancement of the Civil Reserve Air Fleet. The phasing of these programs from the present until the mid-90s considers three parts: near term improvements to our existing forces, combined with mid and long-term improvements.

Our existing forces will continue to serve us if spares, modification and manpower programs are adequately funded. The Air Force's C-5A and C-141 will be kept on line through necessary increases in spare parts stocks, aircrew manning, support equipment and aerial port personnel. Also, wing modification programs to the C-5As and C-130s will extend the service life of these valuable aircraft into the 21st century.

Notwithstanding these enhancements, our intertheater airlift capability will still be in need of augmentation. Three mid term programs--C-5B, KC-10 and Civil Reserve Air Fleet enhancement--will add 13.5 million ton-miles per day to our capability. These programs offer an increase in capability at the earliest possible date and at reduced risk.

The C-5 transport is the only aircraft now capable of carrying outsize equipment critical to U.S. combat needs. The addition of 50 C-5Bs to the present inventory of 77 C-5As will provide 65 percent more intertheater outsize capability. The C-5B will be the original C-5A in design but updated with all approved engineering changes, improved avionics, the latest version of the TF-39 engine, a new wing with a 30,000 hour service life and alloys that are more durable and resistant to corrosion. The C-5B will provide a mid-term increase in outsize intertheater airlift, and it will provide it at low program risk. In Fiscal Year 1986, we are requesting funds for procurement of 16 C-5B aircraft and system support.

C-5B

The C-17 will enter the inventory in the 1990s. It is designed to meet our long term intertheater goal and enhance intratheater capability.

The C-17 is designed to perform the full spectrum of airlift missions. It will be capable of carrying all classes of cargo over intercontinental distances directly to the final destination. It can either airland or airdrop a payload and perform low altitude parachute extractions. The flight-proven blown flap technology permits C-17 operations into small airfields previously restricted to C-130s. The C-17 will provide an intratheater outsize capability not currently available. This unique ability to accomplish both the intertheater and intratheater mission provides a qualitative as well as a quantitative improvement in airlift capability.

C-17

The C-17 is designed to be our most reliable and supportable airlift aircraft. It will have a lower life cycle cost and a lesser manpower requirement than any other aircraft examined in the Airlift Master Plan that provides equivalent capability. The Air Force request for Fiscal Year 1986 funds will continue full scale development leading to a production start in FY 1988 and a FY 1992 Initial Operational Capability.

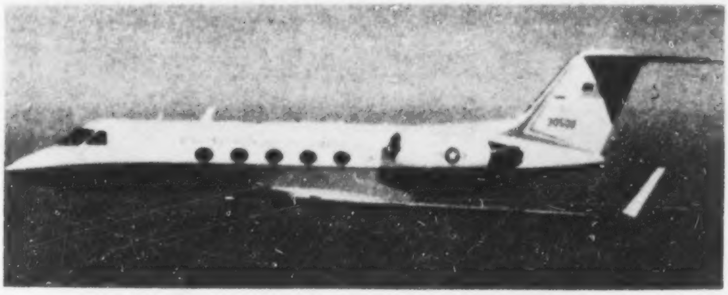
The Civil Reserve Air Fleet enhancement program provides for the modification of existing commercial Boeing 747 aircraft to include installation of a cargo floor, a strengthened door and a cargo handling system. Under the program, the government pays only for the modification and associated operating and maintenance costs caused by increased weight over a 12 year contract period. In return, the Air Force has the use of these aircraft in the event of a military emergency. The current enhancement program will modify 19 aircraft and provide 2.9 million ton-miles per day of airlift capability. The additional capability carries approximately one-sixth the cost it would take to buy, operate and maintain comparable military aircraft.

Another key mobility program replaces the CT-39 aircraft with C-12Fs and C-21As. The CT-39 fleet is nearing the end of its operational life, and both operating and maintenance costs are rising. The C-12F/C-21A lease program, which include full contractor maintenance and supply support, allows the Air Force to replace the T-39 force while simultaneously reducing total funding required for operational support aircraft. These support aircraft have a wartime mission of time-sensitive movement of critically-needed personnel and cargo and a peacetime mission of cost-effective pilot seasoning. In Fiscal Year 1986, we are requesting funds to continue the lease of C-12F and C-21A aircraft.

C-12F Operational Support Airlift Aircraft

C-21A Operational Support Airlift Aircraft

The C-20A will replace the aging and inefficient C-140B and will provide transportation for the President, Vice President and other high ranking dignitaries of US and foreign governments. Eleven C-20As will be purchased for the special air mission at Andrews AFB and the operational support airlift mission in Europe. Our Fiscal Year 1986 request will provide the funds to procure the remaining eight fully-configured special mission C-20As.

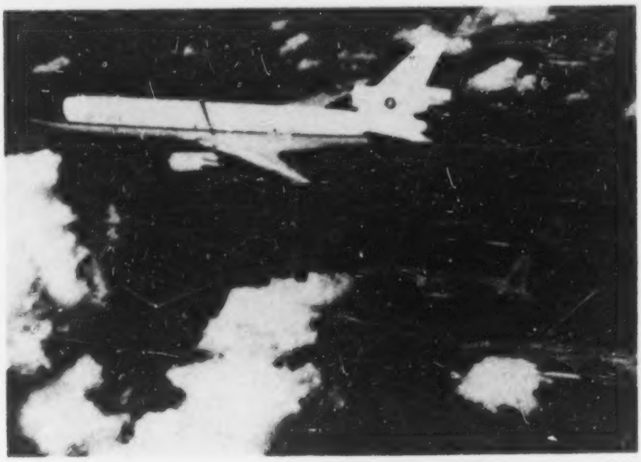


C-20 Operational Support Airlift Aircraft

AERIAL REFUELING

Deployment operations are heavily dependent upon aerial refueling. Our KC-135 tanker force, procured in the 1950s and 1960s, was originally dedicated to support the strategic bombers' wartime mission. Since that time the number of Air Force, Navy and allied aircraft capable of being refueled inflight have grown more than sevenfold. Moreover, the 1973 resupply of Israel demonstrated the dependence of airlift and tactical deployments on aerial refueling. When foreign nations denied overflight and landing rights for ground refueling, aerial refueling proved to be a critical element in the resupply. During simultaneous strategic and conventional operations, some missions would be seriously degraded because of tanker shortfalls. Three tanker programs (KC-10 procurement, KC-135R Modernization, and KC-135E re-engining) will help reduce the growing tanker shortfall.

Procurement of a planned force of 60 KC-10s will be complete by FY 1987. Our 1986 request includes twelve KC-10s. The KC-10 fleet will greatly improve the Air Force's capability to support contingency operations, reduce foreign base dependency and enhance our capability for the rapid deployment of combat forces. Airlifter cargo loads can be greatly increased and delivery times to destination reduced through use of the KC-10A because of its large fuel offload and long range capabilities. The KC-10A also can carry considerable amounts of cargo. The 60 KC-10 aircraft are being acquired under a multiyear procurement contract which provides substantial savings compared to an annual procurement approach.



KC-10A Airlift/Tanker Aircraft

COMBAT RESCUE FORCES

Combat rescue forces perform the vital role of recovering downed aircrew members, thus not only saving lives but also returning critical combat resources to duty, denying the enemy a possible source of intelligence and contributing to the morale and motivation of combat aircrews.

The HH-60A Night Hawk Combat Helicopter Modernization Program will provide the capability for rescuing downed combat aircrews in current and future threat environments. The program represents the key to maintaining a viable combat rescue capability in the 1990s and beyond. The Night Hawk is a derivative of the Army UH-60 Black Hawk--an outstanding performer with proven reliability, maintainability, and survivability. We are adding auxiliary fuel tanks and an air refueling capability to the Black Hawk to give it extended range. We are also improving avionics for precision low-level navigation at night and under the weather. The HH-60A will be operational in the active force, the Air Force Reserves and the Air National Guard.

HH-60A Combat Helicopter

We have restructured the HH-60A program to make it more affordable--by reducing our planned buy from 155 to 90 aircraft and simplifying the avionics suite. Our Fiscal Year 1986 request includes funds for procurement of the first three helicopters and advanced procurement for an additional buy of 25 HH-60As in FY 1987. Initial Operational Capability is planned for FY 1988.

SPECIAL OPERATIONS FORCES

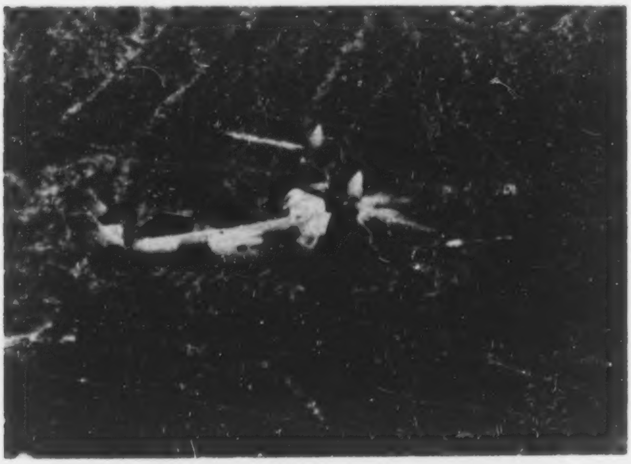
U.S. national security interests require the maintenance of special operations forces capable of conducting the full range of special operations on a worldwide basis.

Our program to procure 21 MC-130H aircraft will provide a much-needed addition to existing Special Operations capability. These aircraft support crisis-response actions as well as covert, clandestine, and/or low visibility operations at all levels of conflict. The MC-130H will be able to conduct long range penetration missions into sensitive areas to infiltrate, to resupply, and to perform limited exfiltration of special operations forces.

MC-130H Special Operations Aircraft

The Fiscal Year 1986 request procures one new MC-130H aircraft, modifies another C-130 to the Combat Talon II configuration and includes advanced procurement for two additional planes. We are also continuing the modification program to improve the capabilities of the existing MC-130E and AC-130H gunships. We intend to modify 20 HC-130 aircraft to tanker configuration for providing air-refueling support for both special operations aircraft and combat rescue helicopters.

The JVX program is a Joint Services effort to develop a common advanced technology vehicle that will satisfy mission requirements of all Services. The tilt-rotor aircraft will bridge the performance gap between helicopters and fixed-wing aircraft by coupling a vertical takeoff and landing capability with medium speed cruise of 250 knots. The Air Force needs the JVX to conduct deep exfiltration special operations missions in night and in adverse weather since these missions cannot be accomplished by MC-130 aircraft. While the Navy will fund the common airframe and engine development, the Air Force will fund those aspects of the program that are Air Force-unique, to include our operational test and evaluation. Our Fiscal Year 1986 request is for development and integration of Air Force-unique avionics systems on the JVX.



Vertical Lift Technology Demonstrator
(XV-15)

SECTION VI

THEATER FORCES

Last year events in the Persian Gulf and Central America demonstrated the global nature of our commitments and national interests. In order to protect national interests and ensure commitments to our allies, our forces must have the ability to meet conventional threats in a worldwide environment. Theaters of concern include Central Europe with its extremely formidable conventional threat; Southwest Asia with varied environments and political scenarios; and both the Atlantic and Pacific theaters with their vast distances and rapidly expanding Soviet naval presence.

To meet the challenges presented by operating in the worldwide environment, the Air Force is placing a high priority on the expansion and modernization of our theater forces. At the same time we are continuing to emphasize readiness and sustainability. We are using our advantages in technology, tactics, and dedicated, well-trained people to ensure our forces are the most capable in the world.

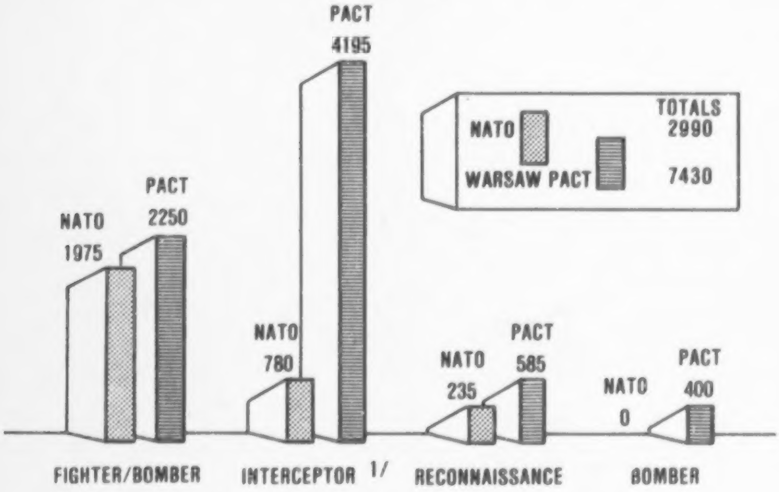
Since the late 1970s, we have placed increased emphasis on organizing and training our active and Air Reserve Forces as a total force. Our reserve components now provide two-thirds of our air defense capability, half of our tactical reconnaissance capability, and one-third of our tactical fighter capability. Modernization of the Reserve components remains essential to our theater forces, which are the backbone of U.S. conventional military power.

The Soviet Union, the most formidable potential adversary of the United States and it's allies, continues to out-produce the U.S. and other NATO countries in armament systems. It is currently placing its newest and most capable weapons systems against NATO forces in Europe. As an example, in 1983 alone the Soviet Union produced 2700 tanks and approximately 4,500 other armored fighting vehicles. This continuing emphasis on armor has brought about a three-to-one Warsaw Pact tank advantage over NATO.

In part, to exploit this tank advantage, the Soviets have developed and implemented the Operational Maneuver Group (OMG). The purpose of this specialized group is to penetrate NATO rear areas quickly through operations independent of the main body of Soviet forces. The OMG mission is to destroy, seize, or disrupt such key elements as nuclear weapons, Command, Control, and Communications (C^3) facilities, and supply lines. Soviet concepts of employment for their air forces have also changed to support their main forces and Operational Maneuver Group operations. The Soviets have transformed their air forces from limited range, low payload defensive day fighters into a long range, offensively potent tactical air force with an increasing capability to operate in adverse weather.

Since 1980, the Soviets have produced an average of over 1100 new fighters a year and are beginning increased rate production of their next generation air-to-air and air-to-surface fighters. The Soviet expansion of tactical aircraft is widening the imbalance in quantitative conventional forces (see chart below), and the U.S. advantage in quality forces is eroding. Although we still maintain an overall lead in high technology systems, the Soviets have made great strides in avionics and propulsion systems which should make their newest fighters, the MIG-29 Fulcrum, MIG-31 Foxhound and the SU-27 Flanker (to be fully operational in the mid 1980s), comparable to our current F-15 and F-16.

NATO/WARSAW PACT COMBAT AIRCRAFT IN PLACE IN EUROPE
(AS OF OCT 84)



1/ MANY INTERCEPTORS CAN BE USED IN GROUND ATTACK ROLES

The Air Force response to the Soviet threat is based on balancing the requirement for readiness and sustainability with the necessity to expand and modernize the tactical force. This means that while our current force must maintain its spares and war reserve levels, we must also expand F-15 and F-16 production in order to modernize and flesh out our Tactical Air Force to the authorized level of 40 tactical fighter wings. Additionally we will begin to produce the F-15E and LANTIRN system to increase our extremely limited night and adverse weather air-to-surface capability. Improvement of our defense suppression and tactical C^3 systems, as well as acquisition of new sensor systems, are improvements also critical to combat effectiveness. One example of a new system is the Infrared Search and Track System (IRSTS) which enters full scale development in Fiscal Year 1986.

Similar to their conventional theater force numerical superiority, the Soviets command a theater nuclear force advantage in Europe. In order to address this shortfall, the Air Force will continue to deploy the Ground Launched Cruise Missile. Finally, we should develop and produce binary chemical weapons, as replacements for the aging unitary weapons in our chemical stockpile. By doing so, we will help deter chemical warfare by forcing Soviet leaders to accommodate possible in-kind retaliation, should they employ such weapons first.

TACTICAL AIR FORCES

Regardless of the theater, our tactical forces must be able to quickly achieve air superiority so that our ground and airborne forces can operate with less disruption from enemy air attacks. They must then be capable of providing offensive close air support to friendly ground forces and also be able to interdict and destroy enemy forces as they move forward in the battlefield.

In order to accomplish these taskings our tactical air forces must be prepared to operate worldwide in a timely and effective manner. Not only must the tactical force be ready and sustainable, but also the force must have the proper mix of specialized and multi-role aircraft to accomplish both the air superiority and the air-to-surface missions. The aircraft must be capable of detecting and destroying targets (both ground and aerial) while working in a numerically superior threat environment. This requires effective avionics, weapons, and propulsion systems that optimize weapons employment and aircraft performance.

Our current munitions inventory includes a large percentage of older type munitions that do not incorporate new weapons technology. To ensure we procure the proper mix of precision guided and unguided weapons, and to properly blend this procurement with the existing inventory, the Air Force has developed a Munitions Acquisition Plan. This munitions plan will guide our procurement of the most cost effective air-to-air and air-to-surface munitions available. The plan also incorporates the research, development and acquisition of the next generation of munitions that will provide even greater capabilities. A significant characteristic of these munitions will be their capability to greatly increase the success rate of each combat sortie, thereby reducing aircraft and aircrew exposure and losses.

On a much larger scale we have developed the Tactical Fighter Roadmap to guide our fighter procurement. The roadmap examines the types, numbers, mix, and capability improvements needed to accomplish worldwide theater tactical fighter force tasks over the next ten years. It is baselined on the composition of today's fighter force and includes improvements to the existing inventory needed to ensure continuing useful capabilities until they are phased out of the inventory. From this baseline, the Roadmap develops the acquisition strategy necessary to meet our future force structure and capability needs.

The acquisition strategy is based on three characteristics: the required numbers of fighters to fleshout, modernize and sustain a 40 tactical fighter wing force, as well as an adequate air defense force; the right mix of fighters with the flexibility and effectiveness to accomplish specialized and multirole missions; and quality improvements for our fighters to accomplish more demanding missions in the face of an increasing threat.

Today our tactical air forces do not have sufficient aircraft to fully equip 40 tactical fighter wings with 72 combat ready aircraft each. Fleshing out, modernizing, and sustaining a 40 tactical fighter wing force, as well as equipping our air defense forces, requires a procurement of 260-280 aircraft per year.

While the total numbers are important, of equal importance is the procurement of the right mix of air-to-air to air-to-surface fighters to meet theater commanders' requirements. The total fighter force mix must provide a balance of specialized fighters for the many air-to-air or air-to-surface missions, as well as multirole fighters, that can be used in either mission role.

The critical and demanding mission requirement to operate over enemy territory around the clock and in weather requires an increased capability. We intend to provide weapon system quality improvements to handle the most demanding air-to-air missions until the Advanced Tactical Fighter is fielded. We have also programmed quality improvements to address night, all weather and long range air-to-surface mission requirements.

This year's budget request continues our emphasis on balancing readiness and sustainability with the necessary tactical forces modernization and expansion. The request provides for continued procurement towards the aircraft quantities required to sustain the current force and provide a small growth towards the 40 tactical fighter wing force. This force procurement will have night and all weather capability with avionics, power plants and munitions which will provide large increases in capability.

Our current air-to-air fighter force is centered around the F-15 Eagle, the best air superiority fighter in the world today. In Fiscal Year 1986 we will improve the Eagle's combat capabilities with already established programs which upgrade offensive avionics, incorporate improved self-protection measures, and provide an improved beyond-visual-range identification system.

F-15 Eagle

Our Fiscal Year 1986 request for 40 F-15C/D fighters represents the final procurement of the F-15C/D air superiority fighter and our initial procurement of eight F-15Es.

Our Fiscal Year 1986 request includes the procurement of eight F-15E aircraft and long lead for 48 in FY 1987. The F-15E retains its predecessor's superior air-to-air capability but adds the capability to conduct all weather navigation, deep penetration, and night/adverse weather air-to-surface attack with large weapons payloads. This aircraft fills an urgent requirement to complement our limited F-111 fleet in the interdiction role.

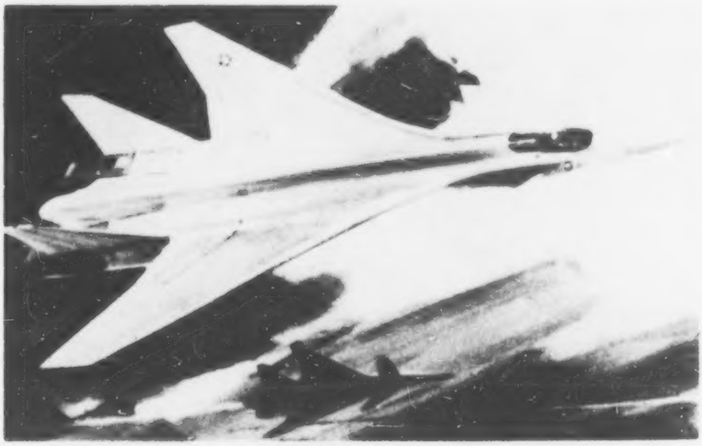
F-15E

The F-16 Fighting Falcon is a true multi-role aircraft. Due to its relatively low cost, the Air Force has procured the F-16 in larger quantities than the F-15 and as such it is rapidly becoming the backbone of our force structure. With its superb maneuvering capabilities, the F-16 complements the F-15 in the air-to-air role. The planned addition of the Advanced Medium Range Air-to-Air Missile will provide the Fighting Falcon with an all weather, beyond visual range kill capability, thereby further enhancing its air-to-air capability. As part of the approved F-16 Multiyear Procurement, we are requesting 180 F-16s in Fiscal Year 1986 and long lead for 180 more in FY 1987. These 360 aircraft will allow conversion of five reserve and five active duty squadrons to F-16s continuing the modernization of active and Air Reserve Forces. Fiscal Year 1986 efforts will also continue to improve the F-16 with the incorporation of upgraded communications, navigation, and electronic warfare equipment to ensure the aircraft's effectiveness through the 1990s.

F-16 Fighting Falcon

We have recently started planning for the F-16F, a modified version of the current F-16C/D. While retaining it's inherent air-to-air capabilities, the F-16F will primarily be an air-to-surface aircraft with enhanced range and payload. The aircraft is being developed to improve the capabilities of the F-16C within its existing mission areas. The Fiscal Year 1986 request includes funding for the developmental effort necessary to define the final F-16F aircraft configuration. We plan for initial procurement of the F-16F in FY 1989.

After a gap of almost 20 years, we are developing the Advanced Tactical Fighter (ATF) as our next generation air superiority fighter. The ATF will take advantage of advances in U.S. technology critically needed to meet the evolving Soviet threat. The Soviets have developed and fielded 5 new fighters in the same 20 year timeframe. The overall ATF program is divided into three functional projects: the ATF airframe development; Joint Advanced Fighter Engine (JAFE) development; and Critical Subsystems Development (CSD) which includes avionics developments. In Fiscal Year 1986, funding for the ATF will continue the Demonstration/Validation phase of the program. This phase, which precedes full scale development, includes airframe development efforts by three contractors. The JAFE project will fund two contractors to develop and construct two engine demonstrators, scheduled for initial testing in late 1986. The Fiscal Year 1986 Critical Subsystem Development (CSD) project will fund initial/conceptual studies for advanced radar and integrated avionics; allow for further development of Pave Pillar advanced integrated system avionics architecture; and fund Very High Speed Integrated Circuit (VHSIC) integration efforts. Overall the budget request is essential to reduce risk for key airframe, engine and avionics related technologies which will support the full scale development program planned for the late 1980's.



Advanced Tactical Fighter (Artist Concept)

Current Soviet doctrine and training demonstrate the intent to take full advantage of the European night and poor weather windows which currently permit operations relatively free from the threat of NATO airpower. In addition, the US Army is rapidly developing the capability to conduct a full range of operations at night. Therefore, there is an urgent requirement to develop a credible night/adverse weather capability to both support friendly forces and close the night sanctuary currently available to our adversaries. At present, the F-111 represents our only night all-weather capability and even the F-111 is not considered capable of providing close air support to friendly forces under these conditions. The Low Altitude Navigation and Targeting Infrared System for Night (LANTIRN) specifically addresses our night adverse weather shortfalls. Designed as a two pod system (navigation and targeting pods) for use with the F-15E, A-10, and F-16; the system includes a terrain following radar, Forward Looking Infrared (FLIR), real world presentation to the pilot on a heads-up display, infrared weapons lock-on and correlation capability and a LASER designator. The system will allow a full range of air-to-surface missions to be accomplished during night/adverse weather, substantially increasing our ability to close the night window to our adversaries and provide direct support to our ground forces in night or adverse weather.

More than 350 test sorties have been flown with the LANTIRN system during the Air Force DT&E and IOT&E test program with over 6000 miles flown at night at or below 200 ft. We have high confidence that the navigation pod, containing the terrain following radar and FLIR, will be ready for production early in 1985. The targeting pod with the LASER designator and magnified target FLIR, has experienced some delays and will remain in development test to support a production decision in early 1986. The Fiscal Year 1986 request provides funds for continued development of support equipment and testing of the LANTIRN system, as well as production funds for the navigation pod, and long lead for the targeting pods.

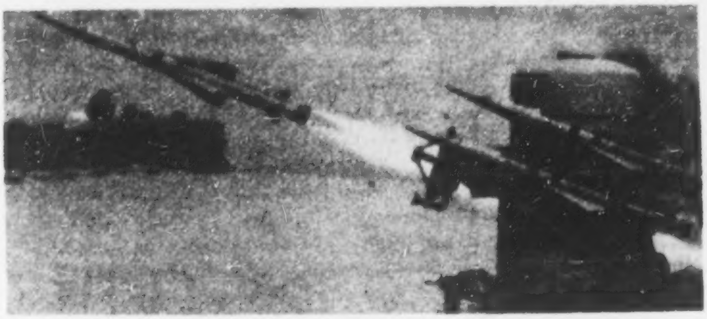
The Alternate Fighter Engine program competitively developed two high durability derivatives of existing fighter engines. We awarded a one year firm fixed price contract in FY 1985 (partial year) for procurement of both the F100-PW-220 engine (installation in F-15s) and the F110-GE-100 engine (installation in F-16s). Our Fiscal Year 1986 buy decision (first full year) is to procure F100-PW-220 engines for installation in F-15s and F-16s and to procure F110-GE-100 engines for installation in F-16s. Future year buys will preserve the competitive aspects of this engine program, with procurement mix to be determined by the Secretary of the Air Force based on deployment plans, demonstrated contractor performance, readiness and supportability, fighter engine industrial base, acquisition quantities of F-15/F-16 aircraft, and the best balance of engines to satisfy Air Force requirements. Fiscal Year 1986 tasks will finish the qualification and integration efforts for these engines and complete their overall development programs.

Funds have been provided by Congress to initiate a development program for higher thrust derivatives of the F100 and F110 engines. This effort will provide increased F-15/F-16 aircraft performance to counter the improved Flanker/Fulcrum threat in the late 1980's. An acquisition plan is being constructed which, as in the case of the AFE, will provide a competitive development and acquisition program. The planned program will lead to production engine availability for FY 1989 F-15 and F-16 aircraft procurement.

The Advanced Medium Range Air-to-Air Missile (AMRAAM) is the next generation missile being developed by the Air Force. AMRAAM will be used by the Air Force, Navy and our NATO allies. Relative to the current AIM-7 Sparrow, AMRAAM provides increased velocity, better maneuverability, a more lethal warhead, improved terminal guidance with an active radar seeker, a greater employment envelope, capability for multiple launches during a single pass, launch and maneuver capability, and improved electronic counter-countermeasures. The missile will be compatible with all USAF and USN frontline fighters and will also meet NATO requirements for air superiority and air defense aircraft. The United Kingdom and West Germany are participating in the development program under a Memorandum of Understanding for a "family of advanced air-to-air missiles". The missile characteristics, and compatability with both US fighters and those of our allies, will greatly increase lethality against a numerically superior adversary thereby acting as a force effectiveness multiplier. The Fiscal Year 1986 request provides for procurement of 90 missiles and advance procurement for the FY 1987 buy. The request also funds a large production effort, and develops a second source follower contractor. Developmentally, the request provides funding for the continuing flight test and demonstration program.

AIM-7M and AIM-9M are the Air Force air-to-air radar and infrared missiles currently in production. The AIM-7M is compatible with the F-15 providing an all weather, beyond visual range kill capability. The Fiscal Year 1986 procurement of 425 AIM-7Ms represents a continuing procurement which will be decreased as AMRAAM procurement increases. The AIM-9M is compatible with the F-15 and F-16 providing a short range, high probability of kill missile which will be used in both theater air superiority and strategic defense missions. This year's request will include funding for 800 AIM-9M missiles.

As part of a continuing effort to improve air base defense capabilities within NATO, the Air Force has entered into an agreement with the United Kingdom. Under this agreement we are procuring 32 Rapier fire units and supporting elements. The United Kingdom will operate and maintain these systems for the United States. Delivery of our Rapier units began in FY 1983 with an initial operational capability achieved in November 1984. Our Fiscal Year 1986 request includes funding for the final phase of the Rapier units to be deployed in the United Kingdom. In November 1984 we signed a broad, but similar, agreement with the Government of Turkey. We will procure and the Turkish Air Force will operate Rapier fire units and support equipment to provide point air defense for our air base in Turkey. Details of the agreement are under negotiation. The Rapier equipment will be purchased by amending our existing agreement with the United Kingdom.



Rapier Surface-to-Air Missile

The Munitions Acquisition Plan, as outlined earlier, presents a requirement for a complementary mix of direct attack and standoff air-to-surface weapons to support our close air support, interdiction and airfield attack missions. Standoff weapons, while more costly, reduce aircraft exposure to enemy defenses and provide a capability to strike with a high degree of accuracy and destructiveness. When the situation permits, lower cost direct attack weapons are used to exploit the exceptional accuracy of our modern aircraft.

In Fiscal Year 1986 we will continue production of the Imaging Infrared (IIR) Maverick. This weapon, developed as an improvement to our inventory of TV guided Mavericks, provides a much needed night capable weapon. The Maverick weapon was developed primarily as an anti-armor munition to provide an offensive air capability against the most serious threat facing our ground forces. The IIR Maverick, with its night capability, provides an excellent weapon compatible with both current and future aircraft systems such as the F-15E, F-16 and A-10.

The Combined Effects Munition (CEM) is a dispenser weapon which, after release, spins up, opens and disperses over 200 bomblets which combine shaped charge, incendiary and fragmentation effects. Designated the CBU-87, the CEM is a 1000 lb free fall general purpose weapon compatible with most USAF air-to-surface fighters. This year's request will continue procurement of the CBU-87.

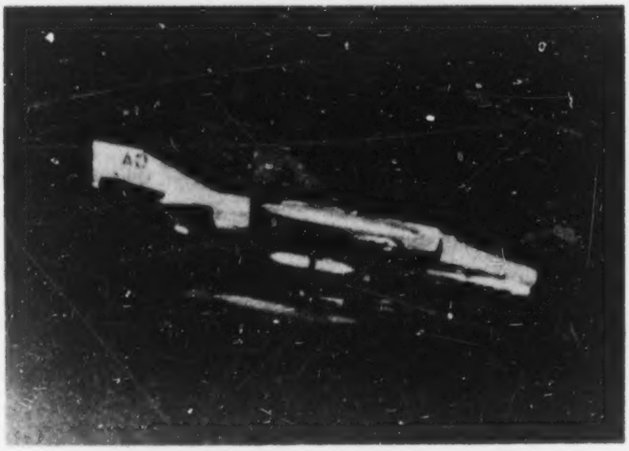
Under the Wide Area Antiarmor Munitions (WAAM) program in Fiscal Year 1986, we are continuing development of the Sensor Fuzed Weapon which will provide a significant increase in effectiveness against armor. The Sensor Fuzed Weapon employs SKEET infrared sensor fuzed submunitions packaged in a Tactical Munitions Dispenser.

Airfield attack against highly defended targets represents a particularly demanding mission where both survivability and mission effectiveness can be directly dependent on the weapons employed. Durandal is a high priority munition specifically designed for airfield attack and represents the only available near term weapon with this capability. Durandal, as a parachute retarded, rocket assisted weapon, allows level, high speed, low altitude deliveries, increasing survivability and accuracy over previous direct attack munitions. Our Fiscal Year 1986 request funds continued procurement of the Durandal and also continues development of a follow-on submunition designated the Boosted Kinetic Energy Penetrator (BKEP). When integrated into a tactical munitions dispenser, BKEP and mines become the Direct Airfield Attack Combined Munition (DAACM). DAACM begins full scale development in Fiscal Year 1986.

For the future, we are developing standoff attack weapons and submunitions capable of attacking a variety of targets. In the recent Memorandum of Agreement on Joint Force Development, the Chief of Staff of the Army and Chief of Staff of the Air Force agreed to complementary Joint Tactical Missile Systems (JTACMS) programs. The Air Force will concentrate on an air launched, longer range capable missile in its Tactical Missile System (TACMS) program while the Army will develop a version of the missile that is ground launched and of shorter range. We are continuing to work with the Army to maximize commonality, and to ensure that our development programs do not produce duplicative capabilities.

The Low Level Laser Guided Bomb (LLLGB) is an evolution to the current laser guided bombs maintained in our inventory. The LLLGB can be delivered from low altitudes and at standoff ranges thereby minimizing exposure to defenses and significantly increasing aircraft survivability. LLLGB production is continued under funding provided in this year's request.

The GBU-15 is a modular guided glide bomb for short range standoff capability to attack point targets with extreme accuracy. The AGM-130 (powered GBU-15) increases the standoff range of the GBU-15 and adds a submunition dispensing capability for use against area targets. During Fiscal Year 1986, AGM-130 development will continue on the 2000 lb bomb. In Fiscal Year 1986, the 2000 lb variant of the GBU-15 will enter production and a new variant, a SUU-54 dispenser loaded with BKEP and mines, will start development. An improved data link will also be developed and the support equipment will be upgraded for increased efficiency and mobility. The GBU-15 will continue in production with both TV and IIR seekers.



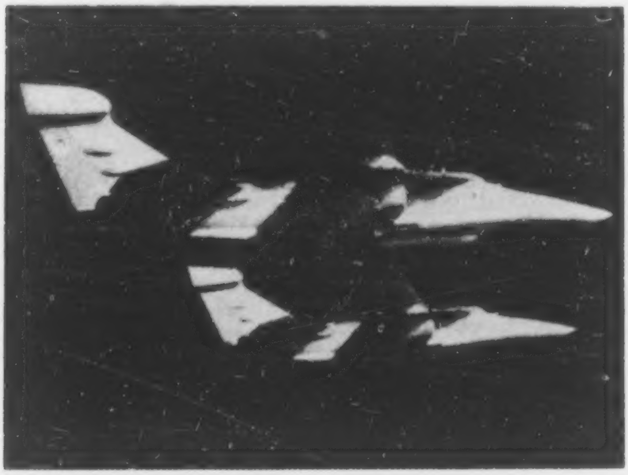
GBU-15 Carried on F-4E

Within the electronic combat spectrum, the Air Force is making a concerted effort to improve individual tactical aircraft effectiveness and survivability. Currently this effort concentrates on modernizing and updating the onboard radar warning receivers and podded electronic countermeasure equipment. Updates are necessary due to the accelerating Soviet deployment of advanced surface-to-air and air-to-air threat systems. The Fiscal Year 1986 emphasis will remain on modernizing existing systems to address the newer threats.

ALQ-131 ECM Pod on F-16

The Airborne Self Protection Jammer (ASPJ) is a joint Air Force/Navy program to build a common, internally mounted jammer to provide electronic self-protection countermeasures. Our Fiscal Year 1986 request includes funds to complete IOT&E, obtain a production decision, and commence full rate production.

In addition to self-protecting electronic countermeasures capable of countering localized threats, there is also a requirement to deal with enemy early warning, acquisition and ground controlled intercept systems. These systems, operating over broader areas represent theater wide threats. The EF-111A has a disruptive jamming system specifically used to counter these threats and represents our only capability against these, systems. Development of updates to the EF-111A are in progress and the Fiscal Year 1986 request continues this effort.



EF-111A Electronic Countermeasures Aircraft

There is also a requirement to disrupt and suppress the enemy command and control structure. Specifically designed for this mission, the EC-130H Compass Call aircraft system will be modified and improved with the Fiscal Year 1986 funding request.

In addition to the use of electronic countermeasures systems, we also require a capability to destroy the rapidly expanding Warsaw Pact surface-to-air threat. This capability is encompassed in the F-4G Wild Weasel, a weapons system developed by modifying F-4E aircraft into the F-4G configuration. The increasing complexity and size of the threat necessitate improvements in Wild Weasel capabilities.

To remedy this situation we are requesting funds in Fiscal Year 1986 to continue the upgrade of the APR-38 Wild Weasel Receiver/Processor to provide a capability against the advanced threat being fielded by the Soviets. This upgrade will ensure frequency coverage, signal processing speed, and capabilities against the threat emitters now being fielded. In addition, modifications to 18 F-4E aircraft will be started in FY 1987 using kits procured earlier and currently on the assembly line to reduce force structure shortages.

A large part of the F-4G Wild Weasel weapon system effectiveness is dependent on the High Speed Anti-Radiation Missile (HARM). Designed specifically for the defense suppression mission, the HARM provides the Wild Weasel with greater standoff ranges, higher speeds and broader threat capability than previous missiles. HARM is in production and in Fiscal Year 1986 we are planning to procure 1715 HARM missiles and continue modifications to the F-4G system to fully utilize HARM capabilities.

The Precision Location Strike System (PLSS) is being developed to provide accurate target location and intelligence information on enemy electromagnetic emitters. The system is key to our future electronic combat capability. PLSS operating in all weather conditions and projected jamming environments will locate electronic emitter targets and provide guidance to those targets for both aircraft and weapons. The capability is critical to rolling back enemy surveillance and air defense systems in a timely and efficient manner. In Fiscal Year 1986 we will continue PLSS production.

E-3 Airborne Warning and Control System

During the past year, our fleet of E-3 Airborne Warning and Control System (AWACS) aircraft again proved its value while supporting operations in the Persian Gulf. As this is the Air Force's only airborne system capable of providing tactical warning and command and control of air operations, we are requesting funds in Fiscal Year 1986 to develop improvements to the E-3 mission system. Full scale development of a communications electronic counter-countermeasures improvement and mission simulator improvements will be completed. Full scale development will begin for an electronic support system addition to the E-3 Surveillance System, which will provide the E-3 aircraft with a passive detection, location and identification capability against airborne, shipborne and ground-based emitters.

While the E-3 aircraft is designed to address the airborne threats, there is a similar requirement to provide real-time detection of ground force movements within the enemy's second echelon. The Joint Surveillance and Target Attack Radar System (Joint STARS) is being developed to locate and track moving targets from the Forward Edge of the Battle Area to deep into the enemy rear area. When fully developed this system will provide the tactical commander a capability comparable to that of the proven E-3 system. Our Fiscal Year 1986 funding request will permit further development of the Joint STARS radar, and incorporation of this multimode radar into the C-18 (modified Boeing 707) airborne platform.

The modern tactical battlefield scenario will require that larger amounts of data be quickly passed among a variety of users. The Joint Tactical Information Distribution System (JTIDS) will provide that data to the greatest possible number of users and will do it securely and reliably in the face of a sophisticated jamming threat. JTIDS is an omnidirectional, high volume digital data system, using state-of-the-art technology to attain an unprecedented capability for equipped participants such as the E-3, surface command and control centers, and selected fighter forces to communicate among each other in a hostile electronic countermeasures environment. JTIDS, as developed by the Air Force, is interoperable with the JTIDS being developed by the other services. JTIDS will also be used by our NATO allies. During Fiscal Year 1986, we will conduct testing of JTIDS for the F-15, and we expect to begin production in second quarter FY 1987. We will also continue the development of the new data link message format which will allow integration into other NATO/US JTIDS systems.

The Enhanced JTIDS System (EJS) program is developing an anti-jam voice communication system to protect critical tactical voice communications against the long-term jamming threat. EJS will employ, for training and interoperability purposes, the same basic Time Division Multiple Access (TDMA) architecture as developed under the JTIDS program and will operate in the same portion of the frequency spectrum as JTIDS. To achieve its higher level of jam-resistance, EJS will also employ a TDMA-like architecture in an alternative frequency band. Taking advantage of the JTIDS TDMA technology base will enhance opportunities for interoperability with JTIDS as well as for eventual integration of systems to perform both anti-jam voice and data functions. In Fiscal Year 1986, we will continue EJS full scale development. Major RDT&E activities include contractor design, fabrication and test of air and ground EJS hardware, planning for testing and integration efforts for specific air and ground platforms.

The requirement to maintain voice communications capability in the battlefield jamming environment has been validated in numerous Mideast wars and NATO exercises. The Air Force has developed and deployed the HAVE QUICK radio system to fulfill this requirement. However there are anticipated counters to the HAVE QUICK system and we are developing near term improvements to address these counters. Designated HAVE QUICK II, these improvements will be integrated through modifications to the existing system. Our budget request continues full scale development of these modifications and begins modifying the existing radios with the HAVE QUICK II improvements.

When employing beyond-visual-range missiles, it is necessary to accurately identify potential targets at or beyond the missile employment ranges. The MK XII system is currently used in the friendly target identification role, however that system is old, unreliable and difficult to maintain. The system being designed to replace the Mark XII is the Mark XV which is being developed as a high reliability, friendly interrogation system. The Mark XV is also under negotiation as a Tri-Service and NATO interoperability identification system. Advanced development hardware will continue development and testing in Fiscal Year 1986 leading to a Full Scale Development decision in FY 1988.

Modernized switched voice and digital data communications are required by our tactical forces, and are being introduced through the Joint Tactical Communications (TRI-TAC) program. The majority of TRI-TAC subsystems will be in production during Fiscal Year 1986, including the AN/TRC-170 troposcatter radio, a family of digital message and voice switches and terminals, and the Communications Nodal Control Element which performs automatic technical control functions. RDT&E efforts in Fiscal Year 1986 will support design of peculiar support equipment for these systems, specification of electromagnetic counter-countermeasures capability for the AN/TRC-170 radio, maintenance of equipment at the Joint Test Facility, and the integration and fielding of TRI-TAC communications equipment.

The surveillance and control subsystems of the Tactical Air Control System (TACS) are rapidly approaching block obsolescence. In coordination with the Marine Corps, we are working to develop and acquire the Modular Control Equipment (MCE) to replace the aging TACS subsystems. MCE will provide capability to handle a significant increase in C^3 workload, enhance service interoperability and reduce life cycle support costs. The Ground Attack Control Center System will incorporate MCE hardware components with additional software programs to provide the TACS with the capability to more rapidly control air attacks against time-sensitive mobile ground targets. In Fiscal Year 1986 we will start the production run for the MCE program.

In addition to MCE development in Fiscal Year 1986, we are procuring Ultra-Low Sidelobe Antennas and Anti-Radiation Missile Alarm Systems and starting the Anti-Radiation Missile Decoy Development program for the AN/TPS-43E tactical radars. These will improve the radar's jam resistance and increase its survivability against anti-radiation missiles.

The US has agreed to adopt the international standard Microwave Landing Systems (MLS) in place of our existing Precision Approach Radars and Instrument Landing Systems. This replacement is being accomplished and funded under the Traffic Control and Landing System (TRACALS) program. In Fiscal Year 1986, TRACALS continues engineering development of a tactical MLS; it also begins programs to update its air traffic control surveillance equipment and to make its fixed base systems survivable in a combat environment. Development will continue in definition of future Air Traffic Control systems to keep pace with civilian airspace management requirements. The new Rapidly Deployable Air Traffic Control System (AN/MPN-XX) development is planned and we will complete plans to competitively procure a replacement for C-140/T-39 flight inspection aircraft.

The TR-1 aircraft, operational since 1983, has proved to be essential to the theater commanders' need for organic near real time surveillance of enemy forces. The aircraft provides high altitude, long endurance, standoff surveillance and is programmed to carry the Advanced Synthetic Aperture Airborne Radar System (ASARS) and also the Precision Location Strike System (PLSS). Total system survivability will be enhanced by basing the aircraft at RAF Alconbury, UK, and by placing the information processing and exploitation stations in hardened underground facilities. The Fiscal Year 1986 program provides for operations and support of aircraft sensors, ground stations and associated personnel, and the procurement of five TR-1 aircraft.

TR-1 Reconnaissance Aircraft

In order to maintain our ability to provide timely battlefield information to the theater commanders, digital sensors with a data link need to be developed. The Advanced Tactical Air Reconnaissance System (ATARS) Program will conduct concept validation for an electro-optical sensor (which produces a digital image) along with a data link. The sensor will be developed for use either in an unmanned vehicle or a reconnaissance pod for carriage on a tactical aircraft. In the upcoming fiscal year, ATARS will also focus on the concept validation of unmanned vehicles' contribution to the tactical reconnaissance mission. In cooperation with the Navy, we will incorporate a suite of imagery sensors into vehicles capable of ground or air launch. Additionally, cost and performance analysis will be conducted to determine whether the vehicles should be expendable or recoverable.

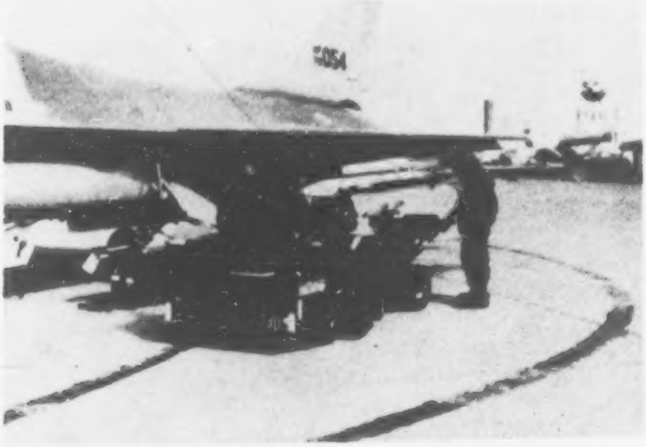
THEATER NUCLEAR AND CHEMICAL FORCES

The deployment of the Ground Launched Cruise Missile (GLCM) is providing the European theater commander with dual benefits. GLCM will help balance the current Soviet superiority in theater nuclear forces and the presence of GLCM also decreases the number of tactical fighters required for nuclear withhold--thereby providing increased theater tactical air capability. GLCM's small radar cross-section and low altitude flight profile make it survivable and complicate the enemy's targeting and defense problems. Our Fiscal Year 1986 budget request includes procurement funds to buy additional weapons systems and spare parts to achieve the NATO deployment schedule and RDT&E funds to establish a new material improvement program.

Ground Launched Cruise Missile

In any conventional conflict, chemical weapons if employed, may well prove to be a decisive factor in the final outcome. The Soviets consider chemical warfare one of the strengths of their forces and maintain a considerable chemical warfare advantage over the US and the NATO alliance. The Soviet chemical industry has the capability to produce toxic agents at a rate sufficient for military requirements. A large quantity of agents are stored in at least nine chemical depots located throughout the U.S.S.R.. Chemical warfare research and development continues, with several new facilities constructed at their Chemical Agent Proving Grounds since the late 1970s. In short, the Soviet advantage in chemical warfare is growing.

It is essential that the Air Force plan for and defend against the effects of chemical warfare. Current defensive protective gear--mask, hood, special suit, gloves and boots--have human factors problems such as induced heat stress, restricted movement, loss of vision and loss of communications. Many tasks, which are already difficult under combat conditions because of poor protective gear, will become impossible in a chemically contaminated environment. It is critically important that better individual protective systems be developed which allow our forces to operate and survive during and after a chemical attack.



Load Crews at Work in Chemical Defensive Gear

However, the development of better individual defensive equipment alone cannot be considered an adequate deterrent. Even with improved individual equipment the Soviets would enjoy a significant advantage if our forces had to operate under these conditions. In fact, our lack of an effective retaliatory capability could provide the Soviets with a powerful incentive to use chemical weapons. Our present capability is extremely limited and can no longer be considered an effective deterrent.

It is therefore necessary to develop and reestablish a retaliatory chemical deterrent capability. The retaliatory capability, combined with a strong chemical defense, will provide a credible deterrent and both elements--defensive and retaliatory capability--should be considered essential to any chemical program.

Our Fiscal Year 1986 request includes funds to continue the development and procurement of new gas masks, improved protective gloves and clothing, advanced chemical agent detection and warning systems, survivable collective protection systems, and new decontamination equipment.

In order to reestablish a credible retaliatory capability, we must replace our aging stockpile of unitary chemical weapons with modern binary chemical munitions. Binary weapons provide the flexibility and safe handling characteristics we seek for a U.S. chemical capability. Binary munitions, unlike unitary chemical weapons, do not become toxic until the two non-toxic components are mixed. Our Fiscal Year 1986 request seeks funding to initiate production of the Bigeye binary bomb.

SECTION VII

ACQUISITION MANAGEMENT IMPROVEMENTS

The Fiscal Year 1986 budget was developed in an environment in which a broad range of new acquisition management practices had been established.

The success of the Air Force research, development and acquisition program depends on a strong, efficient management system. Within the past year the basic process through which we acquire complex weapon systems has been subjected to meticulous evaluation, and numerous management techniques have been refined to insure better control of our resources. In conjunction with this budget submission, a broad range of these improvements will be continued.

High costs of systems are being reduced through a variety of techniques including multiyear contracting, leader-follower practices, dual sourcing, recompetition and other techniques. Reforming spare parts and support equipment acquisition is at the top of our priorities list. We are dedicated to increasing the rate of competition across the board in Air Force contracting. Firm goals and specific steps to reach them have been set in motion. Program stability continues to be an important management and programmactic goal.

Several industrial base initiatives are directed at improving both the quality and cost effectiveness of contractor-produced goods and services. The Air Force will maintain an active effort to build a sound industrial foundation for its research, development and procurement programs and to enhance wartime readiness and sustainability. The quality of our systems is receiving top level attention. We are now requiring that reliability and maintainability be given the same priority as cost, schedule and performance.

Better Air Force contracts will be possible only through the fine efforts of our professional contracting staffs. Included among the 1986 initiatives are programs designed to improve training, lengthen program director assignments and reward the people who help strengthen our system of competition.

SPARE PARTS AND SUPPORT EQUIPMENT ACQUISITION

No other area of acquisition management has captured the attention of the American public or Air Force management as has spare parts acquisition practices. Media accounts of the purchase of apparently overpriced spare parts have not highlighted the fact that the vast majority of spare parts and support equipment items are acquired at fair and reasonable prices.

Our spare parts acquisition and logistics system while not without fault is actually a good system. We support 122 active bases and 150 Guard and Reserve installations as well as radar sites, ballistic missile locations, electronic combat operations sites and other auxiliary airfields. In all we support some 2,835 installations around the world. In the area of spare parts alone, the Air Force manages some 835,000 different types with an active inventory worth more than $38 billion. We process more than 4 million procurement actions each year. The system is large, it is complex, it is dynamic and it employs literally hundreds of thousands of people.

Recognizing its size and complexity, we have worked hard to identify deficiencies and improve the system. As a result, many new procedures have been implemented that will correct faults in the system permanently.

The basis for these improvements has been a series of major studies undertaken by the Air Force over the past two years to uncover the reasons for high spare parts costs. Increased funding for spare parts had been requested to ensure greater readiness and sustainability. The Air Force's own internal oversight and review systems revealed that significant savings could be realized within that enhanced budget through tighter management actions.

The first spare parts initiatives involved a change to the requirements process. In April 1983, a study was completed that recommended 26 improvements to the Air Force's system for forecasting aircraft replenishment spares. We have implemented 19 of the suggestions to date. The others, which are dependent on data automation hardware and software acquisition, should be completed by 1987.

The most exhaustive spare parts study ever undertaken by the Air Force was that produced by the Air Force Management Analysis Group in November 1983. The 62-member group of logistics and contracting professionals made 178 recommendations which have served as the Air Force's guidepost for solving the overpricing problem. The group found that as a result of spares underfunding and a lack of manpower, the acquisition process had not focused on low value spares contracts. A lack of competition, limited data, and ineffective pricing techniques were to blame. A General Officer Steering Group at Air Force headquarters directs and monitors implementation of these reforms by Air Force acquisition personnel at all levels. It is our intent to make these system changes institutional to preclude problem recurrence.

As is the case with spare parts, support equipment is bought in small quantities but in large lots of diverse items. Because the equipment must support and maintain specific weapon systems, their development and purchase parallels that of the weapon system itself. In March 1984, a Support Equipment Acquisition Review was done to study this process carefully. Nineteen areas were identified for improvement in forecasting, planning and pricing. Controls were needed to deter the proliferation of support equipment. The General Officer Steering Group will be directing the progress of initiatives stemming from this effort.

The Air Force Systems Command and Air Force Logistics Command have shouldered the enormous task of identifying excessive prices. Both organizations have established systematic price reviews of individual spares and support equipment already on contract. These reviews ensure we are paying fair prices for the hundreds of line items in large spare parts contracts. Systems Command has pulled together contract specialists, price analysts and engineers at Air Force plants to review each item's price to see that it makes sense. During FY 1984, the command recommended price reductions that totaled more than $92.8M. The Logistics Command similarly has used teams of price analysts and engineers in Competition Advocate offices who develop target prices used by contracting personnel in negotiations. The command last year conducted 63,000 item reviews for price reasonableness and developed target prices for more than 16,000 items.

The Department of Defense Spare Parts Breakout Program is a major management enhancement that demands we identify parts that can be procured competitively or from actual manufacturers rather than from the prime contractor. To accomplish that goal, Air Force Logistics Command's Competition Advocates screen anticipated buys for potential breakout to the actual manufacturer. In FY 1984, we expect the breakout program to continue increasing competition among Air Force contractors, reducing sole source procurements, broadening the industrial base and lowering prices for spare parts.

Screening hundreds of thousands of spare parts for price reasonableness is a laborious and time consuming process. To speed up this process, we have called on all Air Force personnel to help through an envigorated Zero Overpricing Program. First established in 1979, the program encourages and rewards Air Force personnel who report prices of goods and services suspected of being unreasonably priced. An in-house campaign that publicized our need for price challenges has produced excellent results. The number of challenges submitted by Air Force military and civilian people increased from 2,700 in fiscal year 1980 to 6,930 in 1983. We expect close to 12,000 challenges in FY 1984. Although only five to eight percent of these challenged prices are documented as overpriced, the growing cost awareness among Air Force people has produced solid results. The Air Force has taken appropriate action to obtain refunds or pursue alternate remedies when overpricing is verified. To date, we have collected over $1 million dollars in refunds.

We have changed our philosophy on property disposal. We are now stressing a policy of retention. Previously, we viewed the disposal of spare parts in our economic interest if the inventories exceeded specific long-term usage projections. Instead of facing the potential that discarded parts might be repurchased, we now direct that Air Force managers retain parts as long as we have systems that require them. It should save money and contribute to our readiness.

The Secretary of the Air Force directed a five-point program in 1984 that began with a moratorium on all disposal actions. We are pleased to report that many new procedures are now in place or soon will be, that implement the five-point retention program. The validated changes will mean an expected removal of the moratorium in the Spring of 1985.

COST REDUCTION

The Air Force believes that increasing competition is the most important thing we can do to reduce the cost of all acquisitions, from major weapon systems to spare parts. To support this belief, a new office of the Air Force Competition Advocate is being established to further increase our attention on competition. The advocate, a general officer, will be on the staff of and report to the Assistant Secretary of the Air Force for Research, Development and Logistics. This office will review all justifications for proposed noncompetitive awards exceeding $10 million and recommend disposition to the Assistant Secretary. In addition, the advocate will be an advisor to the Air Force Deputy Chief of Staff for Research, Development and Acquisition for all aspects of the competition process. In addition, this past year the commanders of 15 major commands and operating agencies established three-year competition plans designed to reach the goals established. We have sent to the field more than 200 Competition Advocates to serve in more than 160 contracting locations throughout the Air Force. Our advocacy efforts have been made institutional through published directives that map out program infrastructure. We have given emphasis to proven techniques such as second sourcing, component breakout and subcontract competition. These techniques serve to mandate the use of competition throughout the acquisition cycle.

Second sources are being used in a number of major programs at the prime contract level. These include production contracts involving the Alternate Fighter Engine; the AIM-7M and AIM-9M air-to-air missiles; the IIR Maverick air-to-ground missile; and the Ground Launched Cruise Missiles. We are introducing a second source into full scale development of the Advanced Medium Range Air-to-Air Missile. Second sourcing is also planned for contracts projected for user equipment under the Navstar Global Positioning System for satellite navigation.

Below the prime contractor level, the Air Force is actively working to save contract dollars. By breaking out components from prime contractors for competition, we save overhead and handling costs. A variety of subsystems and components now are being pursued. These include canopy transparencies, wheels and brakes for the F-16 multi-role fighter and the ACES II ejection seat used in the F-15, F-16 and B-1B aircraft. Competition by our prime contractors with their vendors and suppliers also is being actively encouraged. While subtier competition is not recognized in Air Force competition statistics, it produces all the benefits of competition for our weapon system programs.

The Air Force is gradually moving away from a pricing methodology that is based on past contractor expenditures. We are substituting for that practice with the use of a cost reduction technique called "Should Cost." This tool helps management develop pricing information based on estimates of efficient production. Our new policy, soon to be reflected in an Air Force supplement to the Federal Acquisition Regulation, will establish criteria for the application of Should Cost. A formal report, attached to the Contracting Officer's price negotiation memorandum, will be required. The extra documentation will become part of a history that will be available for use by other Should Cost teams faced with similar program efforts.

The Air Force has persistently applied the "Work Measurement" standard, MIL-STD-1567A, to more than 90 contracts to date. Program managers use this source of direct labor productivity informtion as a baseline for estimating manufacturing costs. This data also is of value in our negotiations for fair and reasonable contracts. Air Force Systems Command reviews contractor productivity data in all program assessments and has issued policy requiring the use of engineered work standards in estimating and negotiating contract costs.

PROGRAM STABILITY

To be efficient, the acquisition process must operate in an environment that has stable requirements, financial resources and managerial support. Unless stability exists, the acquisition process will be continually faced with uneconomical program stretchouts, cost overruns, technology updates and management inefficiencies. The Fiscal Year 1986 program assumes employment of proven management techniques that encourage this vital stability in programs.

This year we plan to baseline more acquisition programs, to manage them against firm standards established by agreement between Air Force headquarters and our major commands. The agreements involve formal commitments by all parties on system requirements, program content and approved funding. We now have successfully used baselines in programs such as the KC-10 tanker-cargo aircraft, the Ground Launched Cruise Missile and the Defense Meteorological Satellite Program. Many other programs will be affected this year. Agreements are in process. The program baseline is a valuable management tool that works to enhance stability and control acquisition costs.

In calculating annual budgets, the Air Force routinely determines which costs are most likely to occur and then uses independent cost analyses to better refine the cost estimates. As proof, Air Force program costs have remained relatively stable over the last two years as reported to Congress in the Selected Acquisition Reports (SARs). Although total SAR program costs have increased (due to the addition of several programs), analysis of individual SAR program cost changes from 1981 to 1983 shows a decrease of $1 billion (base year dollars) and $6 billion (then year dollars). Cost growth, including quantity changes, declined from 111% of the Development Estimate (DE) in 1981 to 30% of the DE in 1983 (base year dollars). Discounting the fluctuations in quantities, cost growth has declined from 66% of the DE (1981) to 18% (1983).

Since the multiyear law was expanded in 1982, the Air Force has initiated eight major efforts involving multiyear contracting techniques. The savings from these contracts exceed $3.0 billion. In addition, the agreements have resulted in programs that have been free from major quantity changes that might have otherwise occured during the multiyear contract term. This stability might not have been possible without the detailed process used to select multiyear candidates. We look forward to continued support for our existing multiyear contracts that will continue during the 1986 fiscal year. They include B-1B aircaft production and spare parts, the NAVSTAR Global Positioning System, the KC-10 tanker-cargo aircraft and the Defense Satellite Communication System III satellite. The F-16 aircraft begins its second multiyear procurement contract in Fiscal Year 1986.

INDUSTRIAL BASE

Industrial productivity improvements inevitably lead to better, more reliable, less costly weapon systems. By selectively investing in these improvements and by creating other incentives, the government stimulates contractor re-capitalization and modernization. This, in turn, increases a capacity for industrial surge and wartime sustainability.

As our first order of business, we must push for basic systemic changes that will ensure we get the most reliable, maintainable weapon systems possible for the tax dollar. Reliability reduces life cycle costs. It means fewer spares and less manpower and higher sortie rates. If systems are maintainable, we need fewer people with lower skill levels, and we reduce maintenance times. Equally important, reliability and maintainability improves the mobility of our forces. Fewer people and less support equipment must be deployed.

The Secretary of the Air Force and Chief of Staff have expanded the Air Force commitment to demanding and achieving these goals. In a September, 1984, letter to the commanders of all major commands and separate operating Agencies, they directed that reliability and maintainability now stand as coequals with cost, schedule and performance as new systems are brought into the inventory and as existing systems are modified.

Today, the Air Force is working to ensure this renewed commitment is permanently fixed as standard Air Force business practice. A team of acquisition and logistics specialists from around the Air Force has been formed to spearhead our direction in this fruitful area. An action plan is being created that will affect the entire acquisition process and measurably improve the reliability and maintainability of our current and future weapon systems.

More reliable easier to maintain equipment results in improved weapon support and readiness, which has the potential to be a major multiplier equal in importance with performance factors. This is an area of major concern for the Air Force as is reflected by the significant increase over the last three years in weapon support and logistics related research and development funding.

We have included reliability and maintainability objectives in many of our technology base programs, and we have focused research and development funding for improvements in the logistics system which supports our weapon systems. In addition, we are developing support technologies concurrent with advances in weapon system technology, and we are developing calibration standards for state-of-the-art technologies where no commercial standard exists. In short, we are committed to a course of action which will ensure that early technology efforts include consideration of advances in weapon support as well as performance.

In conjunction with the other Services and the Office of the Secretary of Defense, we are developing demonstration projects in areas where we expect to see a high return on investment in terms of savings in weapon support cost and decreased manpower and skill requirements. We plan to demonstrate a repackaged, partitioned avionics suite which can operate for long periods without maintenance and has the potential to eliminate the requirement for the large, expensive and extensive avionics shop test equipment. The repackaged avionics equipment will affect new systems acquisition, such as the Advanced Tactical Fighter, and provide the basis for significant cost avoidance when older systems are modified to provide a new capability (for example, the Global Positioning System or Joint Tactical Information Distribution System).

We plan to develop and validate criteria for interim standards for graphics, textual, and data exchange for DOD use. The Fiscal Year 1986 initiative will lead to a demonstration of an integrated systems approach to automated drawing storage and retrieval and automated generation, storage, and dissemination of technical documentation. This will also include the integration of the automated engineering drawing system and the automated technical documentation system. Ultimately, this will lead to improved data reliability; and timeliness, and reduced development, transmission, storage and printing costs. A management office will be established which will coordinate the existing and planned development programs in this area. It will also establish the interfaces for Automated Technical Information Programs with training and skill testing programs, logistics support analysis, maintenance, diagnostics maintenance management, inventory management, and logistics C^3 systems within a standard information system architecture.

We intend to continue to give priority and funding to innovative ideas which have a potential for high investment return in the crucial area of weapon support and logistics. To this end, we are establishing a Logistics Research and Development Analysis and Planning activity to identify new high leverage areas for logistics related research and development.

If contract performance standards are to be effective, they must be demanded by formal agreement with the contractor. The Air Force has created a Product Performance Agreement Center at Wright-Patterson Air Force Base, Ohio, to help contracting officers create good, enforceable agreements. The center offers a range of services that will facilitate service-wide use of warranties, guarantees and incentives. It has already assisted managers of many programs, including those for the Peacekeeper strategic missile and Navstar Global Positioning System.

We must improve our quality assurance both in the near and long term. Quality workmanship will be only as good as you demand that it be. We intend to improve the systems for inspecting goods. Initially, the thrust is in two areas.

In one area, we are making better use of "quality indicators." These are quantifiable measures of quality, such as reject rates, removal rates, field reports of defects, volume of engineering design change orders, etc. They already exist and are used on selected programs. Their use should be expanded and made more useful to top management who should deal with them as benchmarks that must be watched as closely as program cost, schedule and performance.

We are also increasing the use of hardware "tear downs" as a means of assuring quality. In a tear down, we systematically disassemble an end item that has cleared all final inspections and tests. We assess its conformance to contractual specifications and engineering drawings. This procedure serves as a check on the entire design and manufacturing process and can reveal workmanship and other product discipline problems.

The Air Force plans to continue investing in its highly successful Manufacturing Technology, or MANTECH, program. Under the program, we have improved the ways industry applies advanced manufacturing methods, processes and equipment in the production of weapon systems. New manufacturing techniques and machine tools developed under MANTECH projects have increased productivity and the ability of industry to surge and mobilize. Our payoff over time will be reduced production and depot maintenance costs, shortened weapons production delivery times, enhanced weapons performance through improved quality, better production yields and the establishment of domestic sources for defense items. Project results are available to all qualified defense contractors.

The Air Force is proud of the way it has aggressively implemented the Industrial Modernization Incentive Program (IMIP), which encourages industry to enhance productivity through capital investment. This defense program evolved from the Air Force's Technology Modernization Program, and the maturity of our experience has led us to evaluate many more programs than might otherwise be possible.

The IMIP is an integrated business and technical approach to modernization. It is based on a business agreement between the Air Force and our contractors where we both share in savings generated by investments in technology and capital equipment. This sharing helps overcome the unattractiveness of cost-based pricing and provides a reasonable return on investment to the contractor.

Currently 35 prime contractors and 25 subcontractors participate in the program. Industry investment through 1992 is currently estimated at $1 billion, compared to Government investment of $300 million. We expect the investment to result in a savings of over $3 billion to the Department of Defense, a 10 to 1 payback.

A healthy Value Engineering program has become part of the Air Force's ambitious industrial improvement program. The objective of Value Engineering has been the removal or modification of everything that adds to contract cost yet does not contribute to performance, quality, reliability or other essential system qualities. Contractors can share in the savings if their creative efforts serve to reduce overall contract costs. Under this program the contractor and the government both benefit from the documented savings.

Value Engineering has produced significant benefits for the Air Force. In FY 1983 alone, our efforts resulted in cost avoidances of $760 million, the most ever experienced by any of the Armed Services. In one instance, the Imaging Infrared Maverick missile program was helped by a Value Engineering proposal that reduced a number of complex circuit devices. Reliability was improved, and a cost savings of more than $172 million will be realized over the life of the system.

DATA MANAGEMENT

Access to technical information remains one of the greatest challenges to acquisition management. Two projects to integrate data systems requirements bear special mention.

The Air Force Systems Command's new management office for the automation of technical information oversees seven major Air Force projects in the areas of: Computer-aided design and computer-aided manufacture; engineering drawings and specifications; and technical publications. Each project is funded separately, has its own management organization and seeks a unique end product.

To assist each project in reaching its goal and to guard against any duplication, the management office has taken on the role of integrator. All projects must progress toward and contribute to the same basic goal: a totally integrated capability to create, store, maintain, retrieve, distribute and use wholly digital technical information in support of all Air Force weapons systems throughout their life cycles.

A comprehensive office information system is now being planned that will link the headquarters Air Staff, Air Force Systems Command and Air Force Logistics Command with real-time management data via an electronic mail system. Through the use of existing word processing management systems and network software previously developed under government contract, we can significantly reduce lead times associated with obtaining contractual information from the buying commands. Besides a reduction in the amount of paperwork, an added benefit is that acquisition management information can be transferred quickly among our major buying units, thereby increasing our ability to obtain and report current information on contracting matters.

PEOPLE ISSUES

We are especially proud of the Air Force men and women who are responsible for the massive improvements to the system now underway. Our acquisition management initiatives are only as good as the people who implement them. People issues are of prime concern to the acquisition community; and changes to the way we manage our personnel resources affect everyone, from the top down.

Congress has directed fixed tours of duty for program managers of major system acquisition programs, and we support the concept. Stabilized tenure helps ensure that necessary management skills and experience exist during critical program decision phases. As major program phases change, the skills necessary to manage programs may change. Consequently, major milestones are considered appropriate points for program management changes.

The Air Force saw additional manpower as an essential element of its plan to reform spare parts management. Without sufficient numbers of people, our competition goals and price reasonableness screening programs could not be accomplished. In FY 1984, our plan called for increasing manpower by 1,000 spaces. So far, 750 spaces have been filled within Air Force Logistics Command, and 192 of the spaces in Systems Command are filled. Complete 1984 staffing is anticipated in FY 1985. The Air Force manpower objective for the spare parts initiatives is an additional 2,849 people by FY 1985 and 139 more by the end of 1989 for a total of 2,988. This additional manpower is critical to the accomplishment of permanent reform in the spare parts and support equipment acquisition process.

A project called "COPPER TOP" was begun to examine current training shortfalls within the contracting work force. A planning team has been organized to size requirements, identify problems with the training system, develop alternatives, and prepare a plan for corrective action. A manual reporting system has been established to monitor training until automated systems will be available for validating revisions to our actual requirements.

Guidance has been provided to field units to incorporate new performance standards for contracting and acquisition personnel under military and civilian performance appraisal programs. Such standards recognize the need to increase competition, create dual sources, break out items from prime contractors, negotiate effectively and price hardware on the basis of its intrinsic value. Other career areas are similarly getting a hard scrub to determine that performance standards reflect our concerns about cost consciousness and competition.

The Air Force has established a specific new award to recognize contracting personnel who excel in obtaining competition. The award, called the "Outstanding Contribution to Increased Competition Award," was established and first presented in 1983. This annual award will provide for continuing emphasis on competition.

SUMMARY

Our goal is to develop and refine the Air Force acquisition management process through well conceived, management initiatives. We are seeking the best balance between performance, schedule, reliability and maintainability, and cost. The constant pressure of changing technologies and the growing threat make obtainment of this goal a complex challenge.

To date, our past efforts have resulted in significant improvements and cost savings. The Fiscal Year 1986 program will provide new opportunities. In some instances, we will need Congressional support to pursue these improvements. We are committed to meeting our goal, and we are confident that the goal of having the most efficient acquisition process possible is clearly achievable. We are committed to making a very good acquisition system even better.

SECTION VIII

CONCLUSION

The United States and our allies continue to face growing military and political challenges from all corners of the globe. As a result, we are experiencing a changing and more diverse threat, broadening the spectrum of potential conflict. Moreover, committed and sustained military investment by many competing governments has caused a shift in several components of the global military balance away from the United States. These shifts form the basis of the current instability in areas such as Central America and the Carribean Basin, which through proximity, are extremely vital to our national security. Restoration of a global balance of power will hinge on our ability to challenge adventurism and neutralize superpower intimidation by strengthening our overall deterrent capability.

Our primary national security objective remains that of preserving the fundamental institutions and values of the United States and our allies. To achieve this, we must first be able to deter attack across the entire spectrum of potential conflict, and second, should deterrence fail, we must be capable of exercising the response necessary to achieve victory.

United States Air Force budget priorities are developed to guarantee our primary security objective. For Fiscal Year 1986, we will again: support investment in our well trained and skilled personnel, modernize our strategic forces and connectivity systems, improve the readiness and sustainability of all forces, enhance our force projection capability, modernize and expand our theater forces, and initiate development of the technology to exploit opportunities in space.

Since 1981, we have made substantial progress toward the commitment to ensure that our military capabilities are strong enough to fulfill their vital purpose. To support this commitment, Air Force RDT&E and procurement programs are prudently structured to sustain the progress achieved thus far. The Fiscal Year 1986 budget request continues a careful balance based on a realistic assessment of the threats posed by several potential adversaries. The success of this commitment depends substantially upon completion of the plan initiated with the FY 1982 budget. Finally, the request represents a fair apportionment among competing military capabilities, program priorities and available material resources.

Congressional approval and funding for our Fiscal Year 1986 budget request will allow us to continue the plan, restore our position of strength, demonstrate unified national resolve and protect and defend our worldwide national interests.

TABLE I
DEPARTMENT OF THE AIR FORCE
FISCAL YEAR 1986 AIRCRAFT PROCUREMENT ESTIMATES
(In Millions of Dollars)

	QTY	FY 86 ESTIMATES
COMBAT AIRCRAFT		
B-1B Strategic Bomber	48	5,461.8
ACM Integration on B-1B	-	122.8
F-16 Tactical Fighter	180	3,389.8
F-15 Tactical Fighter (includes 8 F-15Es)	48	2,138.9
KC-10A Advanced Tanker/Cargo Aircraft	12	447.0
MC-130H	1	79.5
	289	11,639.8
COMBAT SUPPORT AIRCRAFT		
C-5B Airlift Aircraft	16	2,268.1
TR-1/U-2R	8	343.9
T-46A	33	206.1
C-20A	8	168.8
HH-60A Helicopter	3	116.0
Other	-	80.1
	68	3,183.0
MODIFICATION OF IN-SERVICE AIRCRAFT		2,917.8
AIRCRAFT SPARES AND REPAIR PARTS		4,934.6
AIRCRAFT SUPPORT EQUIPMENT & FACILITIES		
Other Production Charges		2,683.7
Common Aerospace Ground Equipment		631.0
Industrial Responsiveness		89.2
War Consumables		86.4
		3,490.3
TOTAL AIR FORCE AIRCRAFT PROCUREMENT	357	$26,165.5M

TABLE II
DEPARTMENT OF THE AIR FORCE
FISCAL YEAR 1986 MISSILE PROCUREMENT ESTIMATES
(In Millions of Dollars)

	QTY	FY 86 ESTIMATES
BALLISTIC MISSILES		
Peacekeeper	48	3,037.3
Replacement Equipment (Strategic)	-	86.7
		3,124.0
OTHER MISSILES		
Other Missile Programs	-	663.0
Ground Launched Cruise Missile	95	553.9
AGM-65D(Maverick)	3500	489.0
AGM-88A(HARM)	1715	478.1
AIM-120(AMRAAM)	90	432.4
AIM-7M(Sparrow)	425	82.3
AGM-130 (GBU-15)	97	48.5
AIM-9M(Sidewinder)	800	43.3
Target Drones	-	35.9
Air Launched Cruise Missile	-	34.4
Replacement Equipment (Tactical)	-	14.5
Industrial Facilities	-	12.9
Rapier	-	7.6
	6770	2,895.8
MODIFICATION OF IN-SERVICE MISSILES		134.5
SPARES AND REPAIR PARTS		539.3
SPACE AND OTHER SUPPORT		
Special Programs		3,023.8
Space Programs		1,145.4
		4,169.2
TOTAL AIR FORCE MISSILE PROCUREMENT	6770	$10,862.8M

TABLE III
DEPARTMENT OF THE AIR FORCE
FISCAL YEAR 1986 OTHER PROCUREMENT ESTIMATES
(In Millions of Dollars)

	FY 1986 ESTIMATES
MUNITIONS & ASSOCIATED EQUIPMENT	1,621.8
VEHICULAR EQUIPMENT	340.9
ELECTRONICS & TELECOMMUNICATIONS EQUIPMENT	2,816.8
OTHER BASE MAINTENANCE & SUPPORT EQUIPMENT	4,758.5
TOTAL AIR FORCE OTHER PROCUREMENT	$9,538.0M

TABLE IV
DEPARTMENT OF THE AIR FORCE
FISCAL YEAR 1986 RDT&E BUDGET ESTIMATES
(IN MILLIONS OF THEN YEAR DOLLARS)

RDT&E PROGRAM SUMMARY

TITLE	FY 86
TECHNOLOGY BASE	825.2
ADVANCED TECHNOLOGY DEVELOPMENT	714.0
STRATEGIC PROGRAMS	3,678.8
TACTICAL PROGRAMS	3,115.1
INTELLIGENCE & COMMUNICATIONS	183.7
DEFENSE WIDE MISSION SUPPORT	2,120.5
CLASSIFIED PROGRAMS	4,941.2
TOTAL RESEARCH, DEVELOPMENT, TEST AND EVALUATION	$15,578.5

PROGRAM DETAILS
TECHNOLOGY BASE

PE #	TITLE	FY 86
61101F	In-House Laboratory Independent Research	17.4
61102F	Defense Research Sciences	206.3
61103F	University Research Initiative	6.3
62101F	Geophysics	38.6
62102F	Materials	54.8
62201F	Aerospace Flight Dynamics	67.5
62202F	Aerospace Biotechnology	50.8
62203F	Aerospace Propulsion	62.6
62204F	Aerospace Avionics/VHSIC	74.8
62205F	Training/Simulation Technology	25.2
62206F	Civil & Engineering Environment QA	7.1
62302F	Rocket Propulsion	41.7
62601F	Advanced Weapons	37.0
62602F	Conventional Munitions	44.8
62702F	Command, Control, Communications	80.7
62703F	Personnel Utilization Technology	9.4

ADVANCED TECHNOLOGY DEVELOPMENT

PE #	TITLE	FY 86
63106F	Logistics R&D Requirements	12.7
63107F	Automation of Technical Information	5.4
63202F	Aircraft Propulsion Subsystem Integration	27.5
63203F	Advanced Avionics for Aircraft	22.7
63205F	Flight Vehicle Technology	22.9
63208F	Recon Sensors/Processing Technology	9.2
63211F	Aerospace Structures and Materials	23.6
63215F	Aviation Turbine Fuel Technology	4.7
63216F	Adv Turbine Engine Gas Generator	29.7
63217F	Special Power Systems	1.9
63226F	DOD Common Prog Language (ADA)	7.5
63227F	Advanced Simulator Technology	4.4
63231F	Crew System Technology	12.8
63244F	Aircraft Non-nuclear Survivability	3.3
63245F	Advanced Fighter Technology Integration	22.3
63250F	Lincoln Laboratory	26.4
63253F	Advanced Systems Integration Demonstration	36.3
63259F	Cartog Applications-Tac & Strat System	1.4
63302F	Space and Rocket Propulsion	8.4
63313F	Advanced Missile Subsystems Demonstration	1.2
63319F	Advanced Technology Cruise Missile	7.7
63363F	Hypervelocity Missile	10.8
63401F	Advanced Spacecraft Technology	9.7
63406F	Advanced Military Spaceflight Capability	.9
63410F	Space Sys Environ Interactions Technology	5.0
63424F	Missile Surveillance Technology	11.6
63452F	Very High Speed Integrated Circuits	193.8
63454F	Non-Destructive Inspection Ad Dev	1.0
63601F	Conventional Weapons Technology	28.6
63605F	Advanced Radiation Technology	19.7
63704F	Manpower and Personnel Sys Technology	2.2

PE #	TITLE	FY 86
63707F	Weather Systems	4.0
63718F	Electronic Warfare Technology	29.4
63723F	Civil/Environmental Engine Technology	11.5
63726F	Fiber Optics Development	3.9
63727F	Advanced Communications Technology	4.9
63728F	Advanced Computer Technology	8.6
63743F	Electro-Optical Warfare	15.8
63745F	Chemical Warfare Defense	6.2
63750F	Counter/Countermeasures-Advanced Develop	14.4
63751F	Innovations in Education and Training	2.3
63752F	DOD Software Engineering Institute	11.7
63789F	C^3 Advanced Development	26.3
	STRATEGIC PROGRAMS	
11113F	B-52 Squadrons	16.0
11142F	KC-135 Squadrons	1.0
11213F	Minuteman Squadrons	31.2
11312F	PACCS and WWABNCP System EC-135	5.2
11316F	SAC Communications	10.6
12310F	NCMC-TW/AA Systems	57.4
12311F	NCMC-Space Defense Systems	73.0
12313F	Ballistic Msl Tac Warning/Atk Assess Sys	2.7
12323F	TW/AA Interface Network	1.5
12325F	Joint Surveillance System	3.1
12411F	Surveill Radar Stations/Sites	20.2
12412F	DEW Radar Stations	40.9
12417F	CONUS Over-the-Horizon Radar	67.5
12423F	Ballistic Missile Early Warning System	13.0
12424F	Spacetrack	9.6
12431F	Defense Support Program	79.6
12432F	SLBM Radar Warning Systems	8.2
12433F	Integ Operational Nudets Detect System	20.5
12436F	C^2 Process/Display System	14.8
33131F	Minimum Essential Emergency Comm Network	97.2
33152F	WWMCCS Information System	8.1
33154F	WWMCCS Information System-JPMO	88.7
33601F	AF Satellite Communication System	132.1
33603F	Milstar	345.7
35155F	Theater Nuc Wpn Storage & Security System	1.0
63311F	Advanced Strategic Missile Systems	173.9
63364F	Advanced Air-to-Surface Missile	79.0
63716F	Atmospheric Surveillance Technology	5.0
63735F	WWMCCS Architecture	8.0
64226F	B-1B	367.4
64234F	Common Strategic Rotary Launcher	72.6
64312F	ICBM Modernization	1580.8
64326F	Strat Conventional Standoff Capability	71.8
64361F	Air Launched Cruise Missile	14.2
64406F	Space Defense System	149.9
64711F	Systems Survivability (Nuclear Effects)	7.9

PE #	TITLE	FY 86
	TACTICAL PROGRAMS	
27129F	F-111 Squadrons	54.5
27130F	F-15 Squadrons	252.1
27131F	A-10 Squadrons	3.1
27133F	F-16 Squadrons	94.9
27136F	F-4G Wild Weasel Squadrons	36.7
27162F	Tactical AGM Missiles	3.9
27247F	Air Force TENCAP	.3
27411F	Overseas Air Weapon Control System	3.1
27412F	Tactical Air Control System	20.1
27417F	Airborne Warning and Control System	137.3
27419F	Tactical Airborne Cmd & Control System	8.2
27423F	Advanced Communication Systems	123.8
27431F	Tac Air Intelligence System Activities	2.2
27435F	Tac Reconnaissance Imagery Exploitation	7.7
27595F	Base Comm-Tac Air Forces	.9
28010F	Jt Tactical Comm Program (TRI-TAC)	4.9
33605F	Satellite Communications Terminals	7.6
35887F	Electromagnetic Combat Intelligence Support	1.6
41840F	MAC Command/Control System	11.4
44011F	Special Operations Forces	14.0
63230F	Advanced Tactical Fighter (ATF)	242.9
63239F	Adv Tactical Air Reconnaissance Sys	20.3
63256F	Jt Service Adv Vert Lift Acft (JVX)	4.9
63307F	Airbase Survivability and Recovery	6.2
63609F	Millimeter Wave Seekers	19.1
63714F	DOD Physical Security Eq-Exterior	1.0
63742F	Combat Identification Technology	8.8
63749F	C^3CM Advanced Systems	3.5
63770F	Jt Survability Target Attack Radar System	3.2
64201F	Acft Avionics Equipment Development	29.4
64209F	F-100 Durability	2.9
64212F	Acft Equip Development	8.8
64218F	Engine Model Derivative Program	122.9
64219F	Integrated Digital Avionics	11.8
64220F	EW Counter Response	37.2
64222F	Nuclear Weapons Support	2.0
64223F	Alternate Fighter Engine	33.4
64231F	C-17 Program	453.7
64236F	Infrared Search and Track System	23.7
64247F	Modular Automatic Test Equipment	10.0
64249F	Night Precision Attack	40.8
64268F	Acft Engine Component Improvement Program	138.6
64313F	Next Generation Trainer	54.3
64314F	Adv Med Range Air-to-Air Missile	101.4

PE #	TITLE	FY 86
64321F	Joint Tactical Fusion Program	26.9
64362F	Ground Launched Cruise Missile	.7
64601F	Chemical/Biological Defense Equipment	22.5
64602F	Armament Ordnance Development	17.6
64604F	Submunitions Development	43.9
64607F	Wide-Area Anti-Armor Munition	15.8
64617F	Air Base Survivability and Recovery	21.9
64703F	Aeromedical Systems Development	8.0
64706F	Life Support System	16.8
64708F	Other Operational Equipment	17.1
64710F	Reconnaissance Equipment	7.8
64715F	DOD Physical Security Eq-Exterior	15.7
64724F	Tac C^3 Countermeasures	17.4
64725F	Combat Identification Systems	13.2
64733F	Surface Defense Suppression	55.0
64737F	Airborne Self-Protection Jammer	11.2
64738F	Protective Systems	65.8
64739F	Tactical Protective System	75.7
64740F	Computer Resources Management Technology	14.0
64742F	Precision Location Strike System	63.1
64750F	Intelligence Equipment	13.5
64753F	Combat Helicopter Modernization	14.1
64754F	Jt Tactical Information Distribution System	91.7
64756F	Side Looking Airborne Radar (SLAR)	20.7
64770F	Joint STARS	260.2
64779F	Jt Interoperability Tactical C^2 System	9.1

INTELLIGENCE AND COMMUNICATIONS

33110F	Defense Satellite Communication System	6.9
33112F	Air Force Communications	1.0
33126F	Long Haul Communications (DCS)	11.5
33144F	Electromagnetic Compatibility Anal Center	7.2
35114F	Traffic Cntrl/Approach/Landing System	29.5
35164F	NAVSTAR GPS (User Eq)	28.7
35165F	NAVSTAR GPS (Space/Grnd Segment)	48.5
63431F	Space Communications	45.0
84733F	General Intelligence Skill Training	5.3

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DEFENSE WIDE MISSION SUPPORT

PE #	TITLE	FY 86
35110F	Satellite Control Facility	83.1
35119F	Space Boosters	221.4
35130F	Consolidated Space Operations Center	87.4
35160F	Def Meteorological Satellite Program	71.3
35171F	Space Launch Support	79.2
63248F	Concept Development	3.0
63402F	Space Test Program	70.4
63438F	Satellite Systems Survivability	4.3
64211F	Adv Aerial Target Development	13.5
64227F	Flight Simulator Development	155.3
64237F	Vrbl Stab In-Flt Sim Test Acft (VISTA)	.4
64411F	Space Shuttle	132.0
64609F	Logistics Technology for Weapons Sys	6.8
64707F	Weather Systems	13.1
64735F	Range Improvement	62.2
64747F	Electromagnetic Radiation Test Facility	3.4
64755F	Improved Capability for RDT&E	46.4
65101F	Project Air Force	17.4
65304F	Acquisition/Command Support - TELECOM	6.6
65306F	Ranch Hand II Epidemiology Study	4.7
65708F	Nav/Radar/Sled Track Test Support	28.3
65806F	Acquisition and Command Support	366.6
65807F	Test and Evaluation Support	431.6
65808F	Advanced Systems Engineering/Plan	3.9
65863F	RDT&E Aircraft Support	59.8
65872F	Productivity Improvement	7.0
65874F	Product Performance Agmt Cntr (PPAC)	1.0
71112F	Inventory Control Point Operations	4.0
72207F	Depot Maintenance (IF)	.5
78011F	Industrial Preparedness	104.5
78026F	Product/Reliable/Avail/Maintain Program	17.4
78031F	Logistics C^3I System	9.9
91212F	Service-Wide Support	.2
91215F	Productivity Investments	1.0
01004F	International Activities	2.9

PREPARED STATEMENT OF MAJ. GEN. ALFRED G. HANSEN, DIRECTOR LOGISTICS PLANS AND PROGRAMS, DEPUTY CHIEF OF STAFF/LOGISTICS AND ENGINEERING, HEADQUARTERS, U.S. AIR FORCE

Mr. Chairman and members of the committee, I am pleased to address selected aspects of the fiscal year 1986 Other Procurement, Air Force (OPAF) $9.538 billion budget request. Today I will discuss the tactical portion of the Electronics and Telecommunications Equipment budget activity, and the Vehicular Equipment budget activity. These two programs total $933.9 million and represent 10 percent of the total fiscal year 1986 OPAF budget request. The remainder of the appropriation funds other Electronics and Telecommunications Equipment, Munitions and Associated Equipment, Base Maintenance and Support Equipment, and classified projects.

I will first discuss tactical Electronics and Telecommunications Equipment, followed by the Vehicular Equipment Program.

ELECTRONICS AND TELECOMMUNICATIONS EQUIPMENT

The tactical communications portion of the Air Force Other Procurement Electronics and Telecommunications fiscal year 1986 budget request is for $593 million, approximately 21% of our Electronics and Telecommunications Program. These funds will provide modern, interoperable, jam resistant, and secure command, control and communications (C^3) equipment for theater and tactical forces. For discussion purposes, the program has been divided into Tactical Air Control, Tactical Command and Control, and Tactical Reconnaissance.

TACTICAL AIR CONTROL

In fiscal year 1986 the Air Force requests $135 million to buy communications equipment that performs the tactical air control mission. A discussion of these programs follows:

Tactical air control system improvements.—Tactical aircraft are guided to their targets by an integrated system of radar, communications, and command and control elements known as the Tactical Air Control System (TACS). Portions of this system are outdated, unsupportable, and incapable of keeping pace with the technology of today's tactical aircraft. Fiscal year 1986 funding will begin procurement of Modular Control Equipment (MCE), a state-of-the-art command and control system to direct and coordinate tactical air operations. Requested funding also begins procurement of the anti-radiation missile (ARM) alarm sensor. This low power radar, collocated with Tactical Air Control System elements, detects an incoming ARM, thus permitting immediate counter-measure action.

Ground launched cruise missile (GLCM) communications.—GLCM communications equipment to be procured with fiscal year 1986 funds includes tactical radios for convoy operations, dispersal site intrusion detection equipment, and base communications systems; for example, radio, technical control, teletype, base cable plant equipment.

Ultra low sidelobe antenna (ULSA).—Fiscal year 1986 funding will provide fourth year production funding for ULSAs which will operate with existing AN/TPS-43E tactical radars. The ULSA antenna reduces radar vulnerability to jamming and, more importantly, to attack by anti-radiation missiles (ARMs). The radar signature is reduced to the point where ARMs must be launched significantly closer to their target to obtain enough radiated energy to lock-on to the AN/TPS-43E radar.

TACTICAL COMMAND AND CONTROL

The information and data obtained by operational tactical systems must be made available to theater commanders and mission planners in real-time. The Tactical Air Forces must possess a versatile command and control system that can be deployed worldwide and that can operate in tactical, bare base environments. The Air Force fiscal year 1986 tactical command and control communications request is for $302 million. A discussion of significant procurement programs follows:

Joint tactical communications program (TRI-TAC).—TRI-TAC is a joint service effort to develop and acquire tactical communications equipment that can be commonly used in combat. The TRI-TAC program is replacing existing logistically difficult to support systems with modern, interoperable, digital equipment that will allow total system security and increased capacity for both data and voice communications needs. The Air Force fiscal year 1986 request will provide fourth year production funds for the AN/TSQ-111 Communications Nodal Control Element (CNCE) buy and first year funding for the unit level circuit switch programs (AN/TTC-42 and SB-3865). Additionally, funds are requested to begin procurement of the digital voice circuit switch (AN/TTC-39) and continue the wideband radio (AN/TRC-170) procurement.

Satellite terminals.—Long-haul tactical communications are essential to the worldwide command and control of the tactical Air Force. Modern ground satellite systems are used to access the worldwide satellite communications network. Fiscal year 1986 continues procurement of anti-jam modems and begins procurement of quick set-up antennas for existing Ground Mobile Force Tactical Satellite Terminals. Funding continues for NATO Air Base Satellite Communications (NABS) which provide critical communications for U.S. forces at dispersed NATO collocated operating bases.

Tactical C-E equipment.—Forward air controllers assigned to Army units require mobile communications systems that are rugged, securable, and interoperable with Army and Air Force communications systems. PACER SPEAK is a replacement program of existing tactical air control teams communications equipment that is obsolete, non-securable, and not able to keep up with Army mechanized combat units. PACER SPEAK will provide modular, solid state, anti-jam radio communications that can be mounted and operated from jeeps, armored personnel carriers, or if necessary, on the backs of forward air controllers. Funds are also requested to procure handheld digital communications terminals that will enable mission data to be sent via hard-to-jam rapid burst transmissions. In addition, fiscal year 1986 funds are included to continue a replacement for the AN/TSC-60, the principal tactical HF radio system, which is obsolete and logistically unsupportable.

Imagery transmission.—Air Force tactical forces have a vital need for rapid dissemination of magazine quality imagery to support targeting and mission planning functions. Fiscal year 1986 funds provide for communications terminals capable of transmitting, receiving and processing digital imagery data.

Hammer ace.—The Air Force Communications Command maintains a cadre of personnel and equipment capable of providing a quick-reaction, limited communications capability for disaster/emergency response. Fiscal year 1986 funds will purchase additional equipment for these teams.

Anti-jam voice.—Enemy jamming of air-to-ground and air-to-air tactical communications is an ever increasing threat to successful wartime operations. Fiscal year 1986 funds are requested to modify existing radios to enhance their jam-resistance.

TACTICAL RECONNAISSANCE

In fiscal year 1986, the Air Force requests $156 million to procure communications equipment that provides theater commanders a near real-time status of the battlefield situation. The programs involved are:

Tactical reconnaissance.—Air Force reconnaissance aircraft and associated ground processing equipment provide commanders with the essential information necessary to plan and conduct military operations. The associated ground facilities and imagery processing, interpretation and dissemination facilities are procured with OPAF funds. These items are capable of interfacing with infrared, photographic and specialized radar sensor reconnaissance systems. Fiscal year 1986 funds will provide tactical signal intelligence support equipment which will provide improvements and product upgrades to a variety of collection systems. Additionally, fiscal year 1986 funds continue funding for the TR-1 ground stations and the associated radar imagery processing equipment necessary to process and utilize data collected by the TR-1 aircraft.

Precision location strike system (PLSS).—The Precision Location Strike System (PLSS) will locate and identify enemy air defenses. TR-1 aircraft will carry the airborne PLSS intercept and data relay equipment. The concept calls for the information to be downlinked from the PLSS equipped TR-1s to a ground site where the data can be processed to provide a near real-time theater wide electronic order of battle. This can be used for intelligence purposes in peacetime and wartime and for defense suppression in wartime. Selected hostile air defenses can then be targeted for attack by a variety of Air Force and Army weapons, including PLSS equipped F-16s. Fiscal year 1986 procurement funds continue the procurement of the PLSS central processing subsystem ground station and site navigation subsystems.

TEREC ground processor.—Fiscal year 1986 funds are requested to begin procurement of Commander's Tactical Terminals. This equipment processes and interprets information transmitted from an airborne platform to provide users with position data on enemy emitters. Such information permits rapid and accurate targeting against hostile forces.

This concludes the Electronics and Telecommunications discussion. The next area addressed will be Vehicular Equipment.

VEHICULAR EQUIPMENT

The fiscal year 1986 budget requests $340.9 million for Vehicular Equipment. Motor vehicles provide vital transportation support for Air Force weapon and base support systems. Vehicles integrate activities and directly affect total mission accomplishment. Vehicular equipment supports flight-line operations, base transportation, maintenance and construction, material handling, and general cargo and personnel movement. The Air Force today has 112,813 vehicles against a requirement for 136,446. Additionally, 28,055 vehicles on hand are overdue replacement. The fiscal year 1986 program procures those vehicles most critically needed to sustain operations. Included within the $340.9 million is $44.6 million for support of the Air National Guard and the Air Force Reserves, providing a full spectrum of vehicles including aircraft refuelers and tow tractors, tactical cargo vehicles, crash/fire trucks, aircraft loaders and materials handling equipment, and roads and grounds maintenance equipment.

Air Force motor vehicles are centrally managed by the Air Force Logistics Command Air Logistics Center at Robins Air Force Base, Georgia. The Vehicle System Management Office at Robins Air Force Base works closely with the Defense Logistics Agency, US Army, General Service Administration and Air Force procurement activities in contracting for vehicles. Multiyear contracting and grouping of like type vehicles into single procurement actions on a competitive basis are two procurement strategies producing excellent results. Fleet standardization, lower support and operational costs have been a product of more progressive buy strategies. The procurement activity at Warner-Robins Air Logistics Center buys vehicles which are unique to the Air Force mission such as aircraft loaders, refuelers, and crash fire trucks. The General Services Administration procures Air Force commercial vehicles rated 10,000 pounds gross vehicle weight (GVW) and below. The Defense Construction Supply Center (DLA) buys various common construction and material handling equipment. The Army Tank Automotive Command (TACOM) procures military design vehicles and larger commercial vehicles rated above 10,000 pounds GVW.

The Air Force Vehicle Fleet is divided into six major categories for budgeting purposes. The following table lists these categories together with funding in the fiscal years indicated.

VEHICULAR EQUIPMENT

[Dollars in millions]

Category	Fiscal year	
	1985	1986
Special purpose	67.7	69.5
Fire fighting	28.9	43.2
Material handling	24.8	37.9
Cargo utility	140.8	132.6
Passenger carrying	22.1	15.6
Base maintenance	53.1	42.0
Total [1]	337.4	340.9

[1] Totals may not add due to rounding

SPECIAL PURPOSE VEHICLES

The $69.5 million requested for this category will be used to procure vehicles designed to provide special functions such as fueling/defueling aircraft, flightline towing of both aircraft and equipment and ground maintenance support. A third, or $23.6 million, will be used to procure a quantity of 216 R-9 fuel trucks. This vehicle, because of its compatibility with the entire aircraft inventory, will continue to serve as the primary aircraft fuel servicing truck. Other significant procurements in this group are 260 flightline tow tractors at an expected cost of $3.9 million; 39 hydrant fuel trucks estimated to cost another $3.9 million and 26 telephone maintenance trucks at $3.8 million. Remaining dollars will be applied to the acquisition of bull dozers, industrial tractors, refuse trucks, hi-lift trucks and gas and water trailers.

FIRE FIGHTING EQUIPMENT

The fire and crash rescue equipment request amounts to $43.2 million. This includes the P-19 crash truck, which is the largest single item in the fiscal year 1986 Vehicular Equipment Program. The cost to procure 140 of these trucks is $23.8 million. This will complete the last year of a five year multiservice, multiyear contract. The P-19 provides the capability of extinguishing both aircraft and structural fires. Other vehicles to be procured are the P-2 ($8.2M), P-18 ($3.9M) and the P-8 ($1.9M). All of the vehicles to be purchased in this category are vital to the Air Force fire protection system.

MATERIAL HANDLING EQUIPMENT

This group of vehicles provides the Air Force with the capability for warehousing and munitions handling. The $37.9 million requested for this category will be used to procure a variety of equipment such as forklifts, aircraft loaders, and container lift trucks. Funds totaling $10.9 million are requested for the 10K forklift. This is the basic 463L air cargo system forklift designed to handle the system related pallets. The 1986 request also seeks approval of $4.5 million to procure 20 container lift trucks for terminal movement of containerized cargo.

CARGO-UTILITY VEHICLES

Funds totaling $132.6 million are requested in the Cargo-Utility category which constitutes the largest dollar volume by category in the fiscal year 1986 Vehicular Equipment budget request. Vehicles in this category are of both commercial and military design and consist of pickup trucks, heavy cargo trucks, truck tractors, trailers, and dump trucks, among others. Funding in the amount of $15.3 million is required to procure 594 High Mobility Multi-purpose Wheeled Vehicles (HMMWV). This vehicle has a central role in Air Force tactical communications and Air Base Ground Defense missions.

Other military design vehicles such as 371 of the two and one-half ton M-35 cargo truck costing $15.6 million and 223 of the five ton M-923/925 cargo truck costing $17.1 million are reflected in this category. All military design vehicles are procured by the Army. The vehicles in this category are key to Air Force transportation and distribution networks, and enhance Air Force warfighting capability.

PASSENGER CARRYING VEHICLES

The fiscal year 1986 budget request contains $15.6 million for procurement of 849 passenger carrying vehicles composed of ambulance buses for emergency medical transportation, buses of various sizes, and sedans and station wagons. The buses in the program will provide for group transportation at air bases and the Air Force Academy, and for the transportation of aircrews. Sedans and station wagons constitute less than five percent of the fiscal year 1986 request and are used for taxi service and in daily general passenger transportation roles.

BASE MAINTENANCE SUPPORT AND CONSTRUCTION EQUIPMENT

The Base Maintenance category contains $42.0 million for procurement of heavy equipment such as front end loaders, excavators, rollers, cranes, and runway sweepers. These vehicles are operated by Air Force Civil Engineers in providing maintenance of runways, roads, pavements, and grounds. These type vehicles also form the backbone of the rapid runway repair (RRR) capability. Air Force watercraft, essential to firing range clearance and drone recovery operations, are also included in this category, as is funding to support spares and repair parts and for necessary modifications to the Air Force vehicle fleet. Funds amounting to $6.0 million are requested in fiscal year 1986 to procure 139 runway/street cleaners and $4.3 million to buy 38 excavators.

Mr. Chairman, this concludes my prepared statement.

Dr. **Cooper**. You have already introduced my hired guns here this morning, so I will dispense with that.

I would also, though, like to introduce Col. John Phillips who is here this morning representing General Hansen, and he can respond to any questions we might have in the logistics area.

At the committee's request, Mr. Chairman, as you mentioned in your statement, we have prepared a set of programmatic briefings that we will give here in short order. Time permitting, we also have a film, a very short film that we have brought along that will give you an overview of some of the munitions development efforts and procurement efforts that we have ongoing. I think you will find it very interesting.

Before I turn the microphone over to General Russ, let me simply say that I truly believe that the tactical Air Force that we have out on the ramp today is significantly better than the one we talked to you about last year, and with your continued support, I truly believe that the one that we will field next year will be even better yet, Senator.

We have made some very significant progress, and I think after hearing our presentation you will agree with me, but it is not all a bed of roses, and given that we have some 250 programs ongoing in the Air Force today of significant size, you might imagine that we do occasionally stub our toe. We are going to talk to you about a couple of those today. You have mentioned two of them in your opening statement.

General Russ is going to lead off with a brief overview of our budget request and show where our tactical request fits in, then he is going to be followed by Gen. Jimmie Adams, who is General Russ' special assistant for tactical modernization, and who is going to give the committee an overview on where we are and give you an update on our readiness and sustainability. He is also going to briefly update the tactical fighter road map that we first briefed to you last year. He will conclude by giving you an overview of our reserve forces.

He then will be followed by General Williams who will conclude our presentation with an overview of several of the tactical programs we have ongoing.

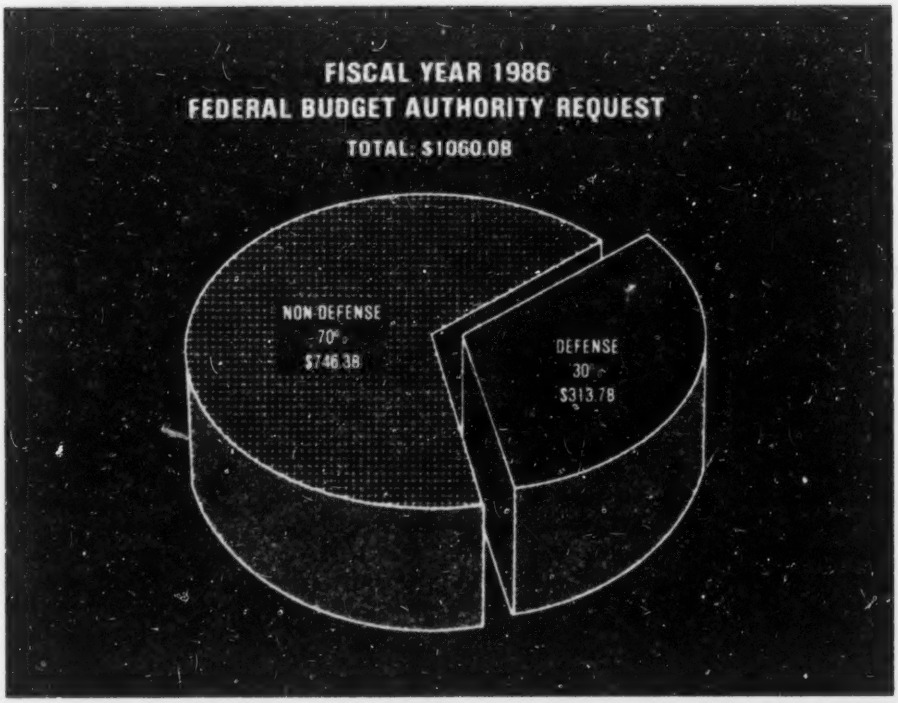
Let me conclude, Mr. Chairman, by saying that I believe the Air Force is a first-class organization, and it is manned by first-class professionals. It really has been a great source of pride for me to be able to associate with it.

And again, you were very helpful in securing my nomination here and approval by the Senate, and I once again want to thank you for that. It has been tremendously enjoyable for me to be associated with the Air Force.

With that, I would like to turn it over to General Russ.

General Russ. Thank you, Dr. Cooper, and it certainly is a pleasure to be back in front of this committee again, sir.

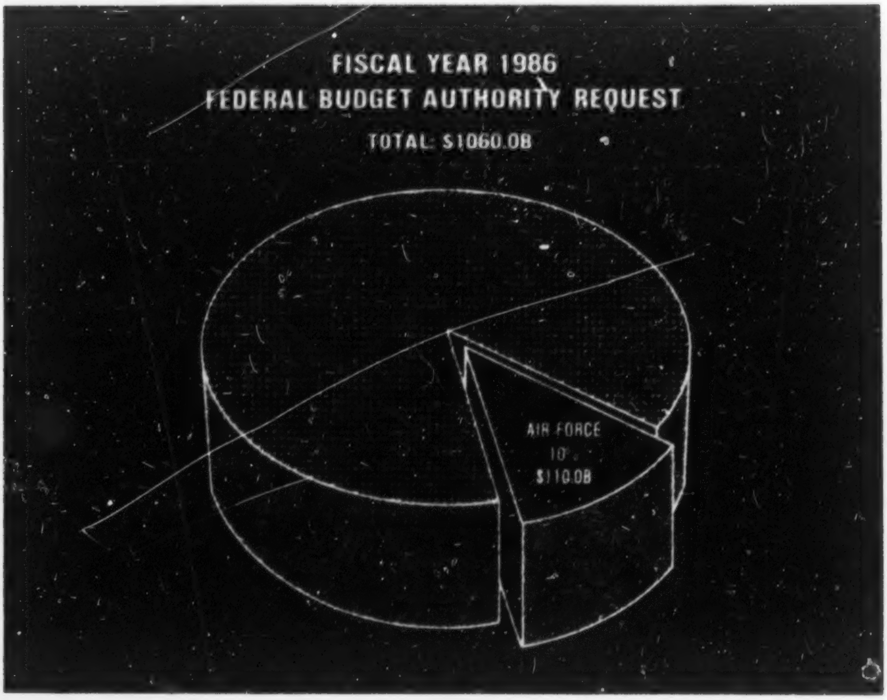
What I thought I would do this morning is just give a short overview of our budget so that I may put the tactical portion of that budget in perspective.



Now, as you know, the total Federal budget is $1,060 billion, and the Defense portion of that is about 30 percent, or $313.7 billion.

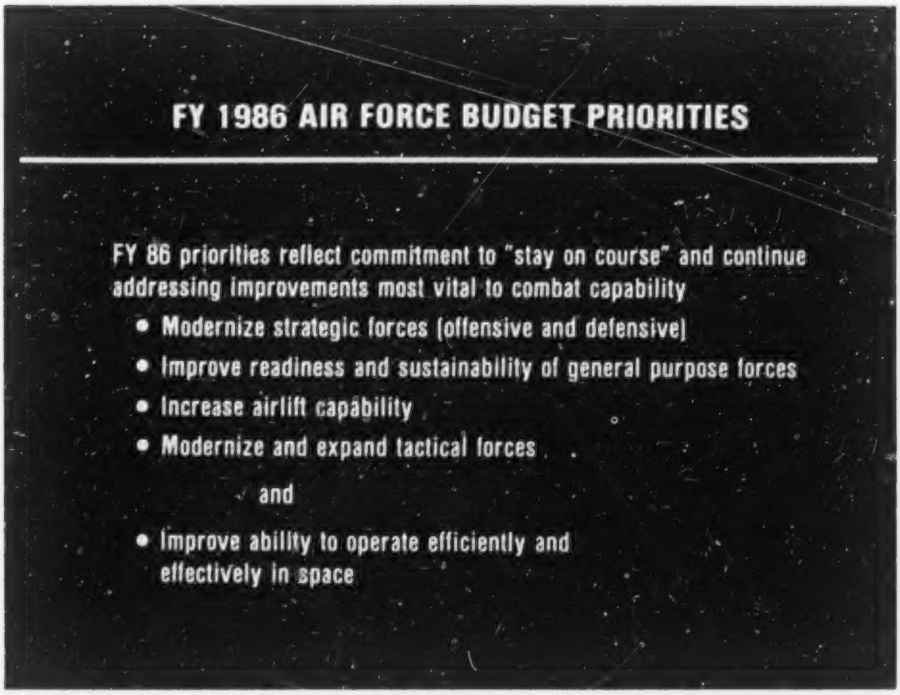
Chairman GOLDWATER. It was.

General RUSS. It was; yes, sir.



FISCAL YEAR 1986
FEDERAL BUDGET AUTHORITY REQUEST
TOTAL: $1060.0B

If you look at the Air Force portion of that, it is 10 percent, and that is $110.0 in budget authority, or the way we operate in total obligation authority, or TOA, that equates to $110.3. But before I get into how that money is allocated, I thought it would be useful to show you our priorities.



FY 1986 AIR FORCE BUDGET PRIORITIES

FY 86 priorities reflect commitment to "stay on course" and continue addressing improvements most vital to combat capability

- Modernize strategic forces (offensive and defensive)
- Improve readiness and sustainability of general purpose forces
- Increase airlift capability
- Modernize and expand tactical forces

and

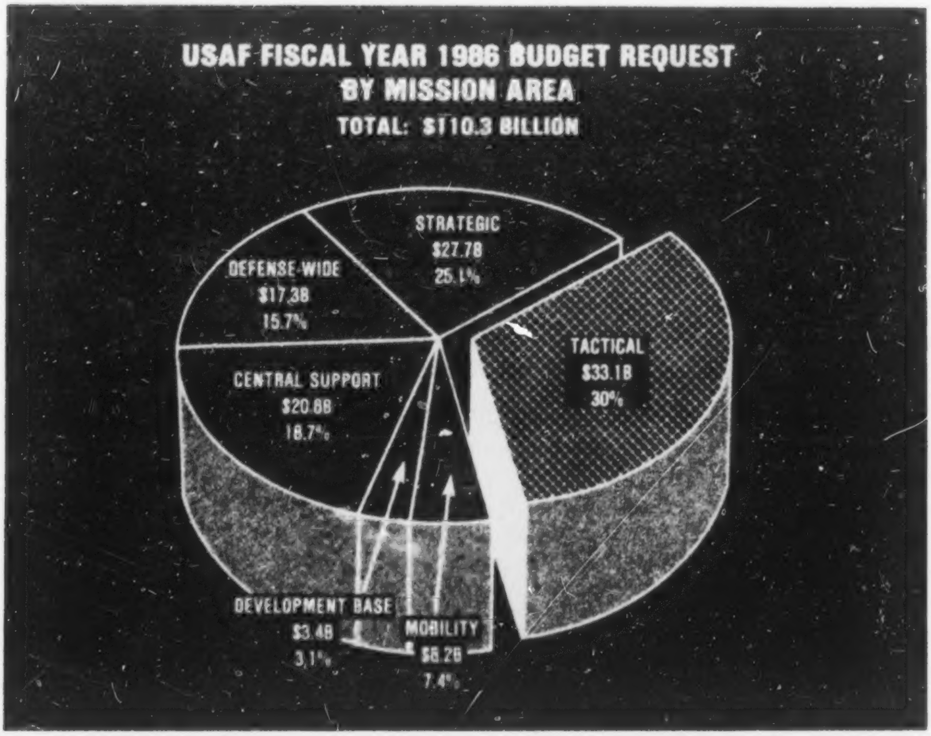
- Improve ability to operate efficiently and effectively in space

These are our 1986 Air Force budget priorities, in other words, the priorities we used to develop our budget, and they reflect a commitment to stay on the course we outlined to you last year.

You can see that the strategic modernization had first priority, readiness of our tactical forces is second, and modernization of our tactical forces is fourth behind our mobility needs.

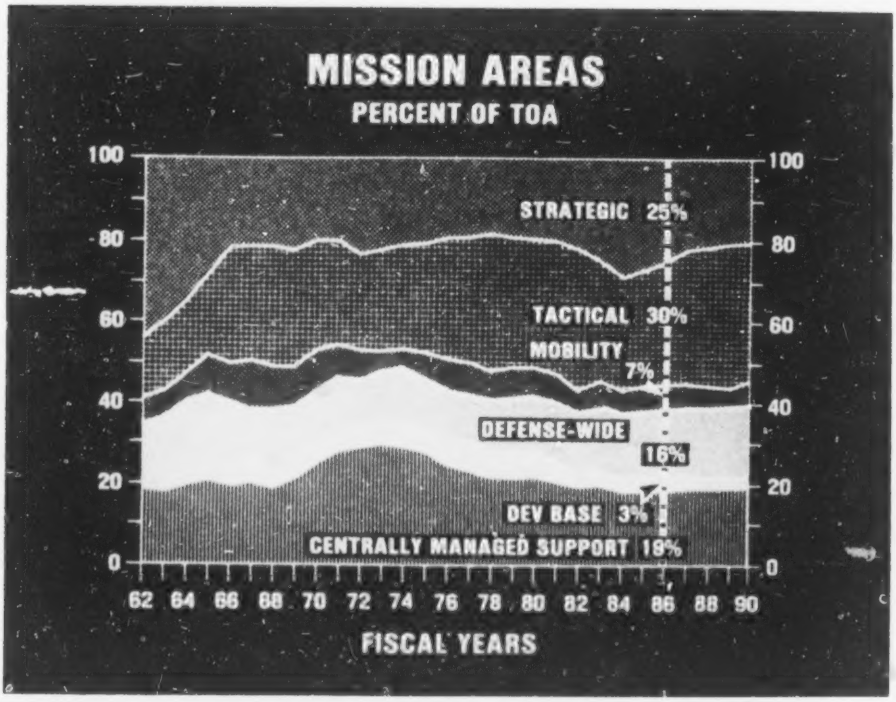
Now, I would be remiss without mentioning our people. Overriding all of these priorities is the need to take care of our people and provide the proper quality of life and pay and retirement and other things for the people that are currently in the Air Force. So we put that first in our priorities.

Now, with those priorities in mind, our 1986 budget request——



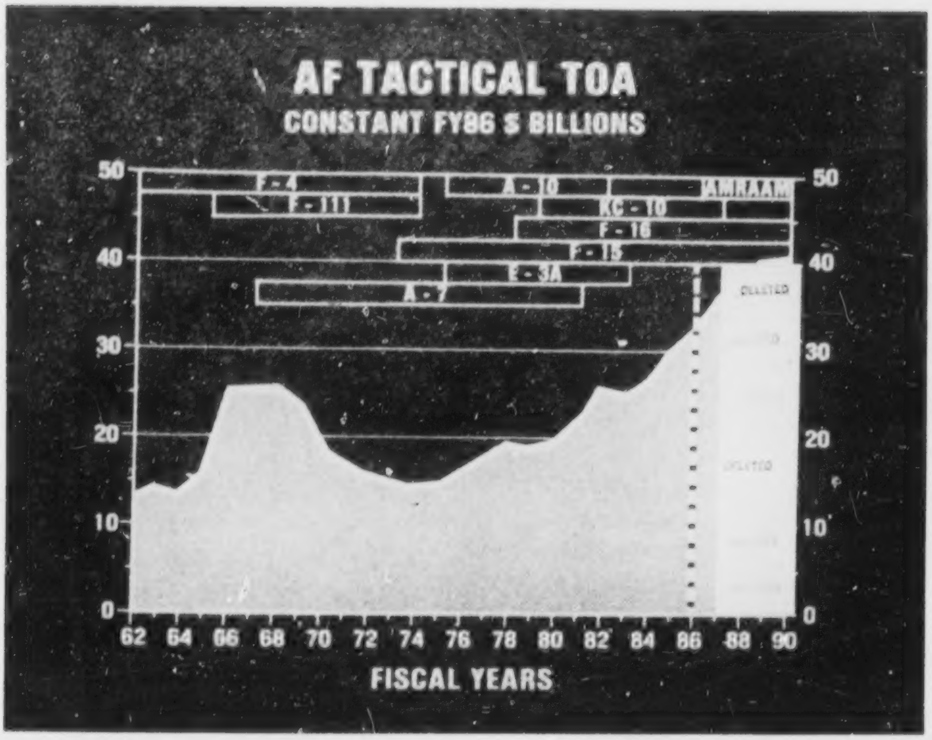
USAF FISCAL YEAR 1986 BUDGET REQUEST
BY MISSION AREA
TOTAL: $110.3 BILLION

Is as indicated on this slide. The $110.3 billion reflects a 5.8 percent real growth, and in dollars that is about a $5.9 billion real growth. The strategic portion of the budget takes about 25 percent. Defensewide accounts for 15.7 percent, and as you know, that includes such things as space-launched support communications, space boosters, Milstar, air rescue, some classified programs, among others. In the central support area, 18.7 percent of the budget, and it includes such things as PCS travel, the training of our pilots, general skill training of our enlisted personnel as well as others—3.1 percent of the budget is for development base or our seed corn for the future Air Force. We call that our technology base. Mobility accounts for 7.4 percent, and the largest section, of course, goes to our tactical forces. We are asking this year for $33.1 billion to equip and operate the force.



I thought it would be useful to look at how this percentage compared to previous years, and this chart goes back to 1962 and shows you the tactical percentage of the budget over the years as compared to the other areas we just discussed. Historically, the average amount of the budget that has gone to tactical forces is 28 percent. Last year 29 percent went to tactical forces. This year we are asking for 30 percent to go to tactical forces, and by 1990, approximately 33 percent will go to tactical forces.

So, the message there, sir, is that we are putting a larger percentage of our TOA into tactical forces.



I think another measure, of course, is in constant dollars, and this chart shows constant 1986 dollars in billions, and across the top of the chart it indicates the major weapons systems that we have procured over the years, or contemplate procuring. You can see that starting in 1975, we have had a steady growth in the funds allocated to tactical forces, as we modernized our force and built toward our 40 tactical fighter wing force. In 1986 the figure is $33.1 billion.

Senator GLENN. Could you put the last slide on again there, please?

General RUSS. Yes, sir.

Senator GLENN. These changes in the buildup of percentages, do you anticipate that they will be steady state from there on out? Does this reflect a changing situation now? Are you getting back to a norm, and are we just correcting past inequities, and this will be about the same percentages on into the future then, or is this temporary?

General RUSS. I would think the future would hold between 28 and 30 percent of the budget will go for tactical forces. As you know, the strategic modernization was the highest priority because of the long lag in time that occurred between the last modernization efforts for our strategic forces, but it tends to be cyclic in nature. We are buying a new bomber, a new missile, and new cruise missiles, and then I think that there will be a reduction in the amount of dollars that go into the strategic forces which I think you can see right now between 1986 and 1990. The tactical forces have two problems: One problem is to flesh out the 40 tactical fighter wings, and the other problem is to modernize and upgrade the current fleet.

So I think we will stabilize around 28 to 30 percent.

Senator GLENN. If we have major cuts, which the chairman just referred to a moment ago, what is protected and what is not? Is strategic protected up there so we are going to see the cuts then coming out of TAC?

Dr. COOPER. Well, as you know, Senator Glenn, strategic force modernization is our No. 1 priority, but that is not to say we are not interested in our other priorities. I think balance is the key. If we are forced to accept reductions, we would want to do it in a balanced way. But we really do want to protect our strategic systems because that is the President's No. 1 priority.

Senator GLENN. The balance then will come from strategic on down and not on the top part of the chart, is that correct?

AIR FORCE PRIORITY PROGRAMS

Dr. COOPER. We have the five priorities General Russ mentioned before, strategic modernization, readiness, and sustainability, mobility, tactical force modernization and expansion in space, and that is where we are putting our emphasis.

Senator GLENN. OK, then, that leaves tactical defensewide, development base, and centrally managed support then to take all the cuts, is that right?

General RUSS. No, sir, this is not a priority chart the way it is laid out. Strategic just happened to be on the top of this chart.

Senator GLENN. OK. Well, I don't want to delay you.

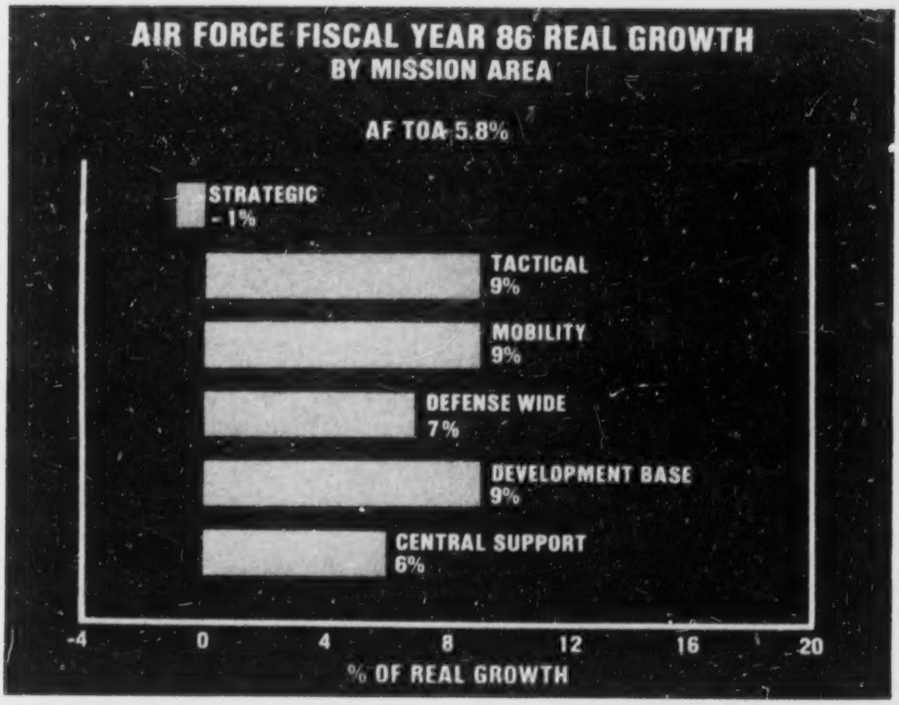
Go ahead.

Dr. COOPER. I guess though, Senator, I don't think it is possible to say that if we had to take a cut, that you should take it out of just one area and not another. You would have to do it in a balanced way. If you were to draw down in let's say fighter production, then perhaps the support that you had budgeted to support that fighter production, should come down a small bit as well.

Senator GLENN. I was just trying to get an idea here that if we do this $18 billion cut that the chairman has referred to in the different hearings here—and I don't doubt that that is about what we are going to have to do, that it is going to, with the strategic programs being protected up there, probably the $18 billion is going to come out of the rest of that, and that is going to hit pretty hard in some of those areas, I presume, but I don't want to delay that discussion.

Go ahead.

General RUSS. Sir, as I was saying on this chart, since 1975 we have shown a steady growth in the real dollars that have been allocated toward tactical forces. In 1986, we are asking for $33.1 billion. Now that increases to 1990 where it levels off just over $40 billion, and of that $40 billion, about 25 percent goes for operating the force, and about 75 percent goes for modernizing and sustaining the force.



The last chart and the last measure I have, sir, is an indication of the real growth by areas. As I mentioned before, the total Air Force budget increased by 5.8 percent in real growth terms. The strategic actually decreased, and that is as a result of the B-1B being the last buy this year and the MX being over the hump. That is close to $2 billion less than previous years.

The tactical modernization has a 9-percent increase, or actually, it went from $30.6 billion up to $33.1 billion, or a $2.5-billion increase, and the other areas had a comparable increase. But overall, in summary, our funding for tactical forces is increasing in real dollars and increasing as a percentage of our budget.

And I would like to echo the words of Dr. Cooper that I believe the tactical forces today are in better shape than they have ever been, not without problems, but certainly significantly better than they were 4 years ago.

Gen. Jimmie Adams will follow, and one of the first things he will discuss is some measures of merit on how we have increased in our readiness, in our sustainability, and show you the track record of what we have done.

TACTICAL AIR FORCE PROGRESS

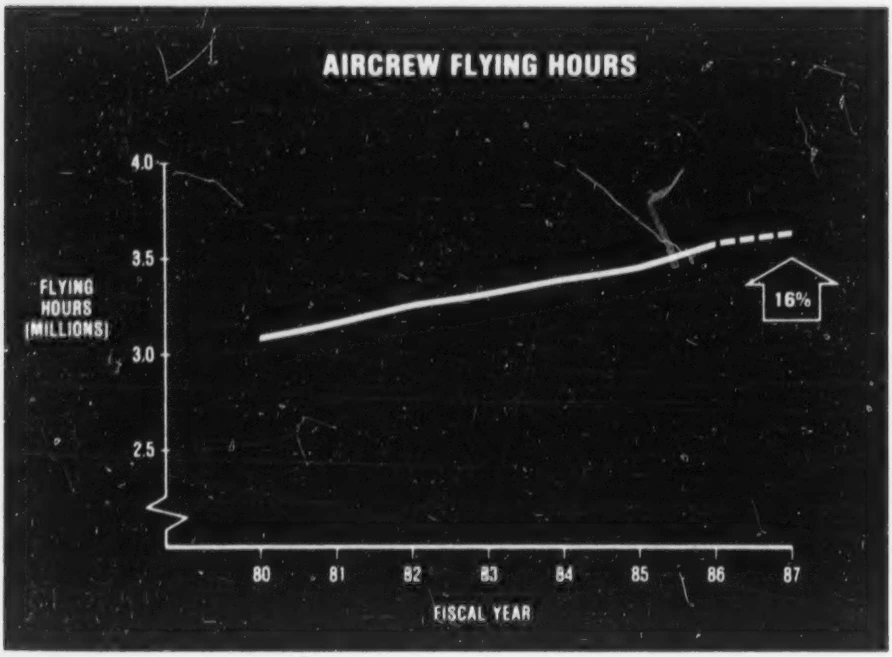
General Adams. Chairman Goldwater, it is a privilege for me to be here today and discuss the progress that we have made in the tactical air forces.

That progress in large measure is a result of the outstanding support that we have had from this committee.

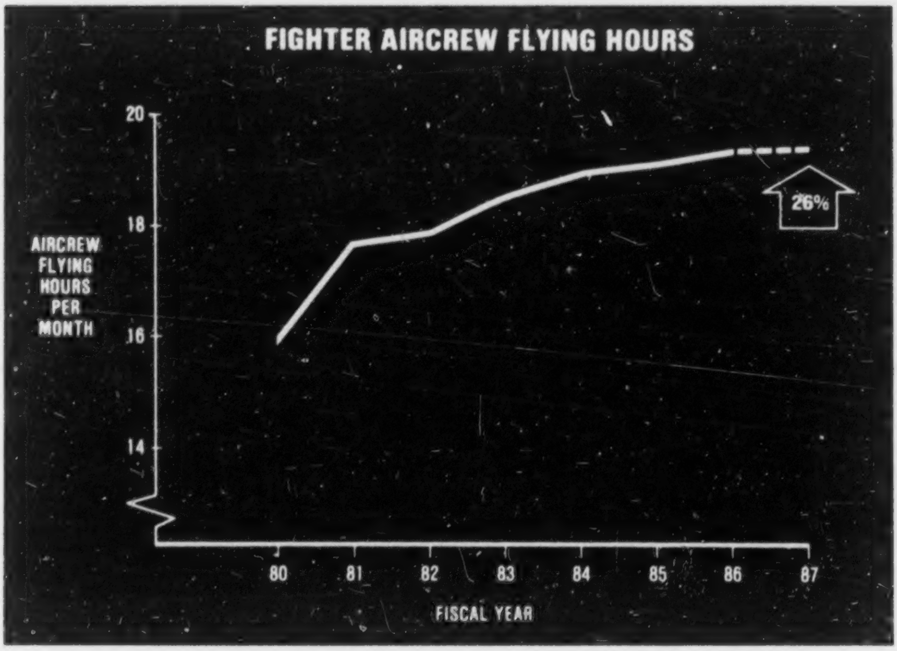
You indicated earlier, the subjects that this committee has asked us to discuss. I will cover these first three areas, readiness and sustainability and the tactical road map to include our procurement strategy, and then we will discuss the vital role that the air reserve forces play in the tactical total force, and then Major General Williams will discuss those selected programs that this committee has requested.

READINESS AND SUSTAINABILITY

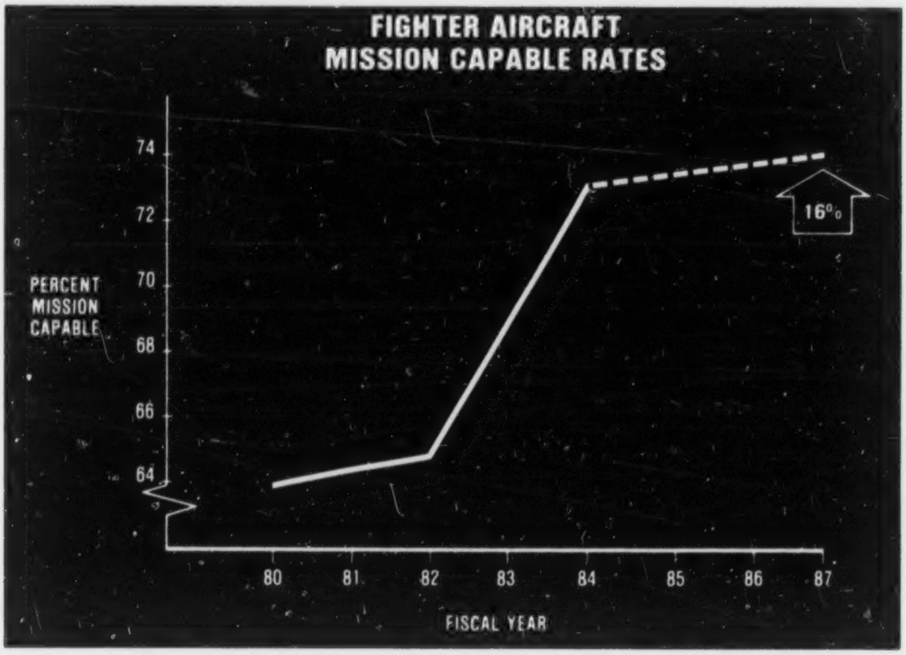
These are the areas that I will talk about in readiness and sustainability. Our flying hours for all of our crews continue to improve.



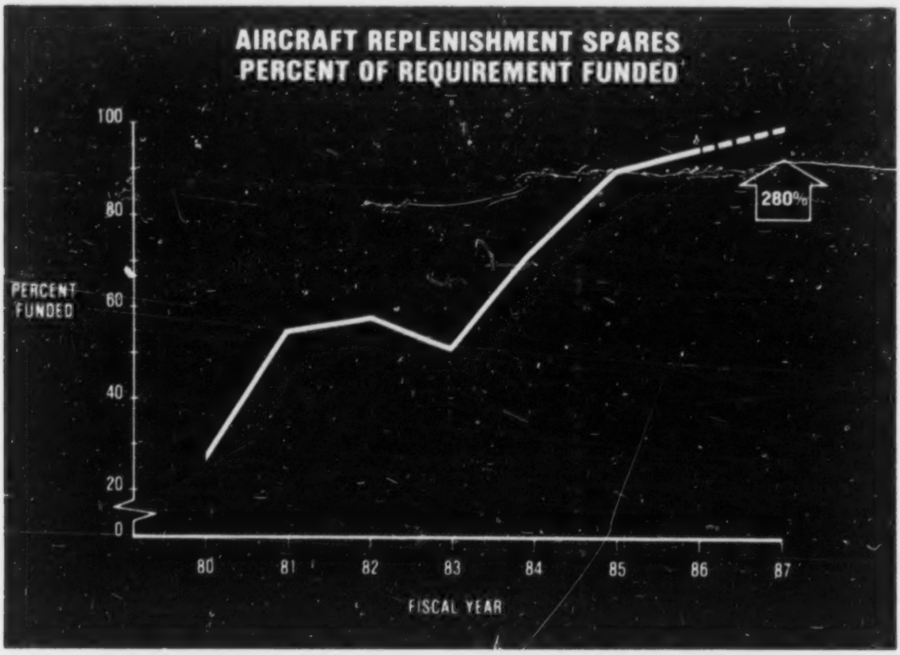
You can see since 1980 we are on an upward trend, and we will increase by 16 percent through 1986. This reflects total aircrew hours for all of our aircrews.



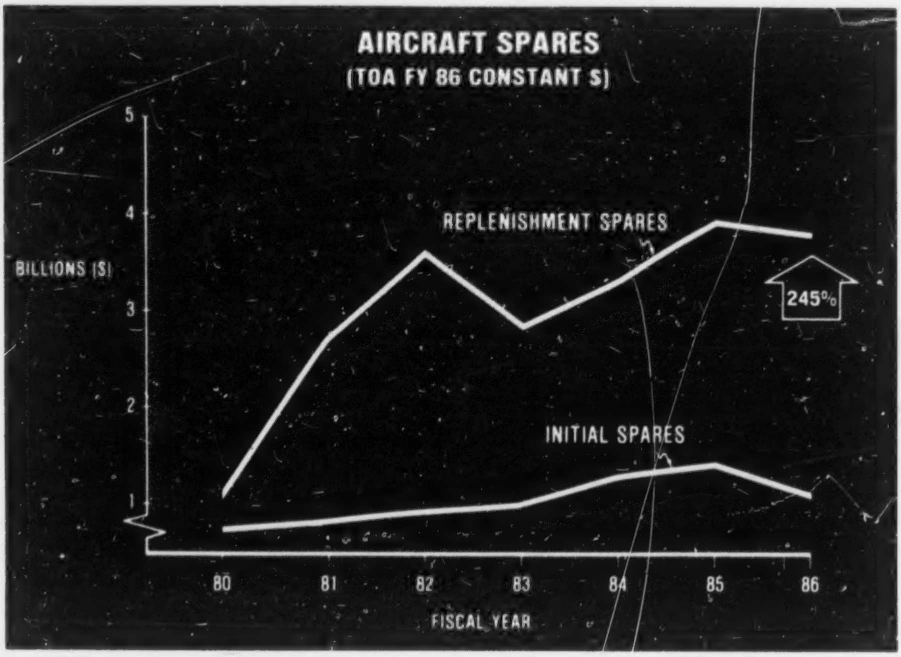
And then broken down for the fighter pilot, we are approaching our goal, stated previously, of 20 hours per crew per month, and we will be at 19.5 for 1985.



That increase in our flying hours is made possible by the increase that we have achieved in our mission capable rates for all of our fighters, and you can see by the number here we are projecting an improvement for 1986 of 16 percent. This is a result of two things. One is that we are modernizing to get more reliable and of course more capable fighters, and at the same time, our spare parts posture has significantly improved.



This reflects that improvement. As this line shows, then, the percent funded against our requirement. You can see we are reaching toward 100 percent. This year's request will fund 100 percent of our peacetime operating stocks, 100 percent of our WRSK and BLSS, that is, those 30 day stocks, and [deleted] of the conventional requirement for up to [deleted]. And if you only consider fighters, it will provide for [deleted] for those fighters for up to [deleted] in our spare parts.



Shown here is the amount of dollars that represents. This line shows the replen spares, and this line shows the initial spares, and then in total there is about $16 billion worth of investment in spare parts for that readiness and sustainability, and then against our requirement for fighting the war, [chart deleted] this line shows the requirement to fight the war for 60 days, and you can see that we are getting to the point where we are able to have the spare parts available for that 60-day requirement.

Chairman GOLDWATER. What percentage of your spares are you now accomplishing by field maintenance?

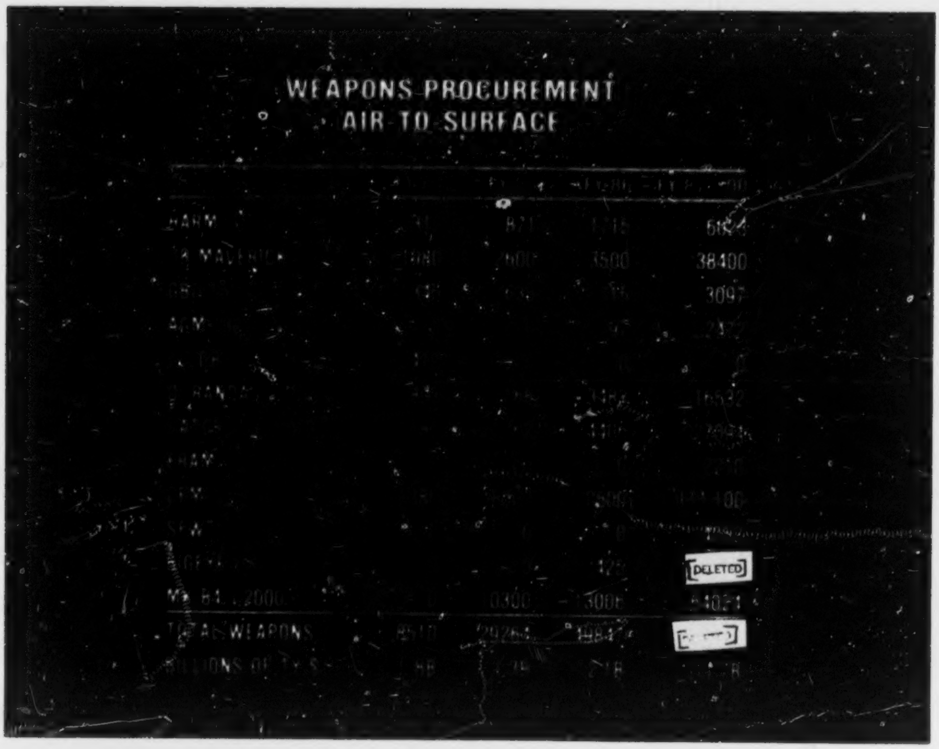
General ADAMS. John, do you have a number on that?

Dr. COOPER. Colonel John Phillips can respond to that, sir.

Colonel PHILLIPS. Yes. Specifically, sir, of the holes in aircraft, 90 percent of them are replaced by repaired parts. So essentially, for a rough order of magnitude, 10 percent of the spares pool are new spares, to be used to fill holes in aircraft.

Chairman GOLDWATER. Thank you.

General ADAMS. Not only do we buy the parts and the flying time to keep our crews proficient and be able to sustain the sortie rate, but we are also buying the munitions to go to those aircraft.



WEAPONS PROCUREMENT
AIR-TO-SURFACE

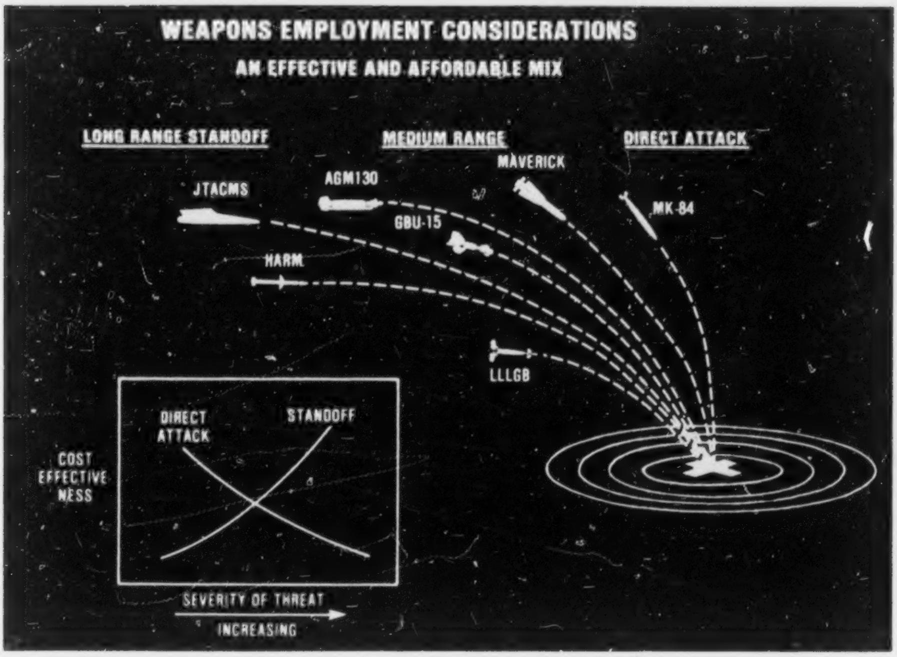
This is a selected list of the air-to-surface munitions that we have requested and have contained in our 1986 request, and you will note that there is a 60-percent increase between 1984 and 1985 for these weapons, and we continue again with a 60-percent increase from 1985 to 1986 in buying those munitions. We are buying a mix of stand-off and direct attack weapons.

Senator GLENN. On those, could you provide the requirements for those weapons systems just for the record?

General ADAMS. Yes, sir, we will.

[The information follows:]

The following requirements for these systems were deleted: HARM, IIR MAVERICK, GBU-15, AGM-130, LLLGB, DURANDAL, GATOR, ERAM, CEM, SFW, BIGEYE, MK-84, and I-2000.


WEAPONS EMPLOYMENT CONSIDERATIONS
AN EFFECTIVE AND AFFORDABLE MIX
LONG RANGE STANDOFF
MEDIUM RANGE
DIRECT ATTACK
JTACMS
AGM130
MAVERICK
GBU-15
MK-84
HARM
LLLGB
COST EFFECTIVENESS
DIRECT ATTACK
STANDOFF
SEVERITY OF THREAT
INCREASING

General ADAMS. The mix of standoff and direct attack is addressed by the severity of the threat in the target area. You can see that in the least severe attack the most effective and efficient way would be to do the attacks with direct attack, but as the threat increases, direct attack weapons become less cost-effective because of the attrition that you experience in the target area. By the same token, although standoff weapons are more expensive, as the threat increases, the cost-effectiveness of the use of those standoff weapons increases.

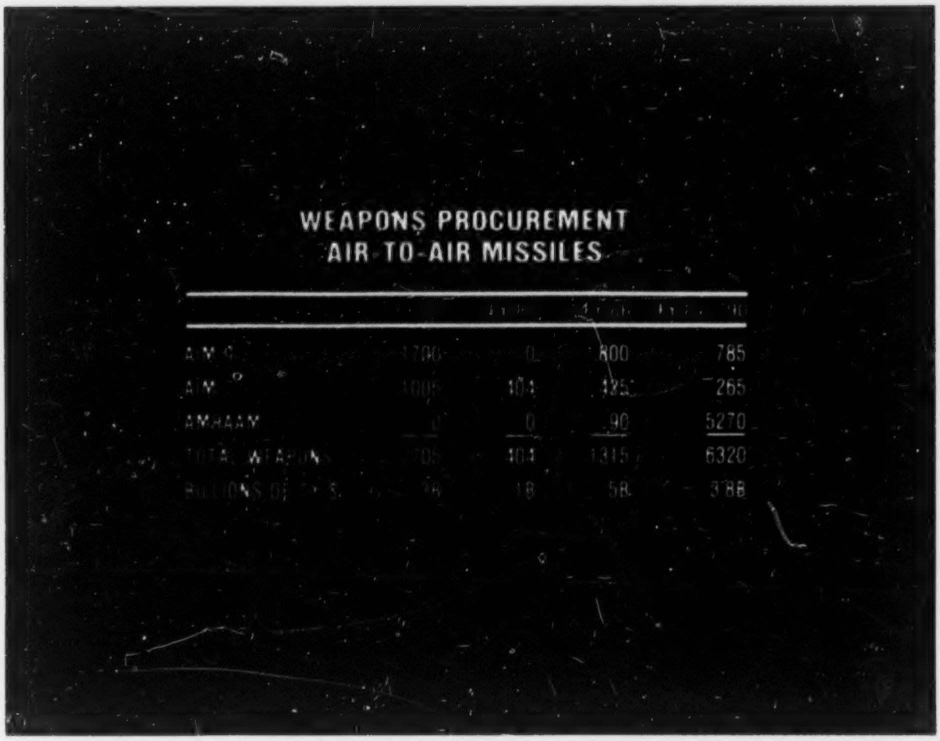
We are developing that family of weapons with a mix that we think is both effective and affordable. You will see requests for improvements for our 2,000-pound bomb, the MK–84 for direct attack. We are looking for medium range standoff with these kinds of weapons; the GBU–15 and the LLLGB give us a low altitude standoff of about [deleted] and then from a high altitude delivery, out to about [deleted]. We are looking for low altitude capability of the boosted GBU–15 or the AGM–130 of about [deleted].

The Harm is used on our Wild Weasel against the threat radars, and then of course, we are developing with the Army the JTACMS for our longer range standoff capability.

[Chart deleted.]

And then this shows against our requirement again for 60 days combat. This line is the requirement of the munitions that we need. We have more than enough munitions to load or to support those sorties that we are able to fly for 60 days. About 60 percent of those munitions are the primary or preferred munitions that are optimized for the kinds of targets that we would attack. The remaining would be loaded with effective weapons, but they are not quite optimum. They are alternative weapons. And it should be pointed out that as we increase our technological capability of the individual weapons, they move out of the primary area, and they are replaced by new, more capable weapons, and some of these primary munitions fall into the alternative munition area.

We think this balance is about the correct one.

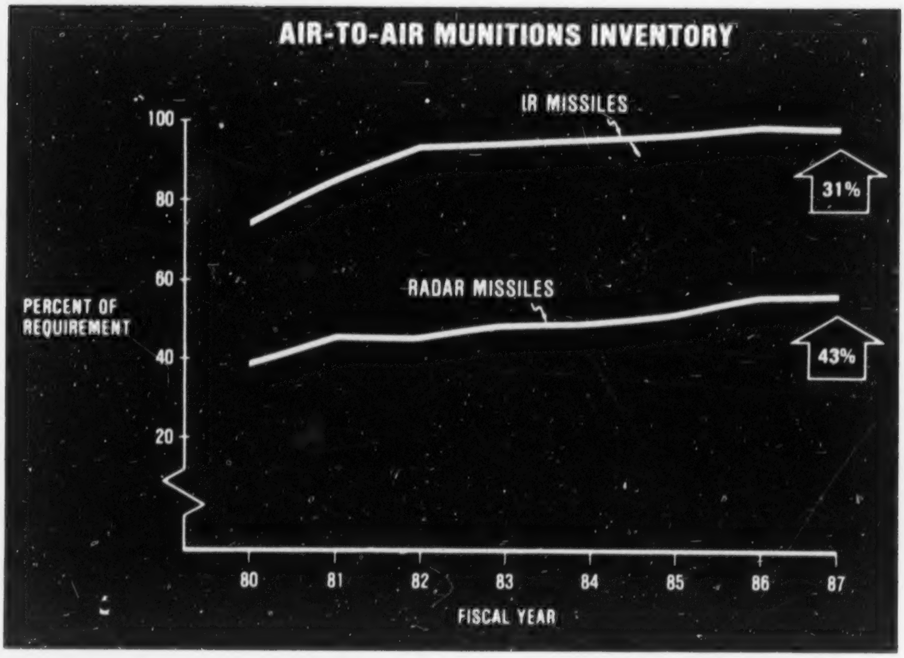


WEAPONS PROCUREMENT
AIR-TO-AIR MISSILES

	[illegible]	[illegible]	[illegible]	[illegible]
AIM-9	1700	0	800	785
AIM-7	1005	104	425	265
AMRAAM	0	0	90	5270
TOTAL WEAPONS	2705	104	1315	6320
BILLIONS OF [illegible] $	[illegible]	.18	.58	3.88

In the air-to-air missile area, we continue to request AIM-9 Sidewinder IR missiles and AIM-7 Sparrow radar missiles. We have a request also for 90 AMRAAM's, and the AMRAAM will be discussed separately as part of the selected programs by General Williams later.

Chairman GOLDWATER. How complete does that make your inventory, let's say, in Europe?



General Adams. Let me go to the next slide, Senator Goldwater.

You can see that for the IR missiles, the Sidewinder, we are just about at 100 percent of our inventory requirement. We have lagged in our procurement of radar missiles because of waiving the transition to the AMRAAM. You can see we are at about a 50-percent inventory level here in terms of missiles.

The numbers of missiles per aircraft certainly depend upon how many aircraft we have used to reinforce. I think if I would give you a number, for example, the in-place air-to-air forces today would have about 5½ loads per aircraft of these missiles, 5½ complete loadouts of these missiles, in addition to being able to support missiles for the air-to-surface aircraft also.

Chairman Goldwater. How many days do you think that is?

General Adams. I don't have a day's figure.

General Russ. Senator, the missile inventory is not figured on days because it is based on the total number of Soviet airplanes that have to be shot down, and the total threat is divided amongst the allies and the United States, and then the U.S. allocation is further divided between the Army and the Air Force and those that will be shot down by Army SAM's, and those that will be shot down by the Air Force.

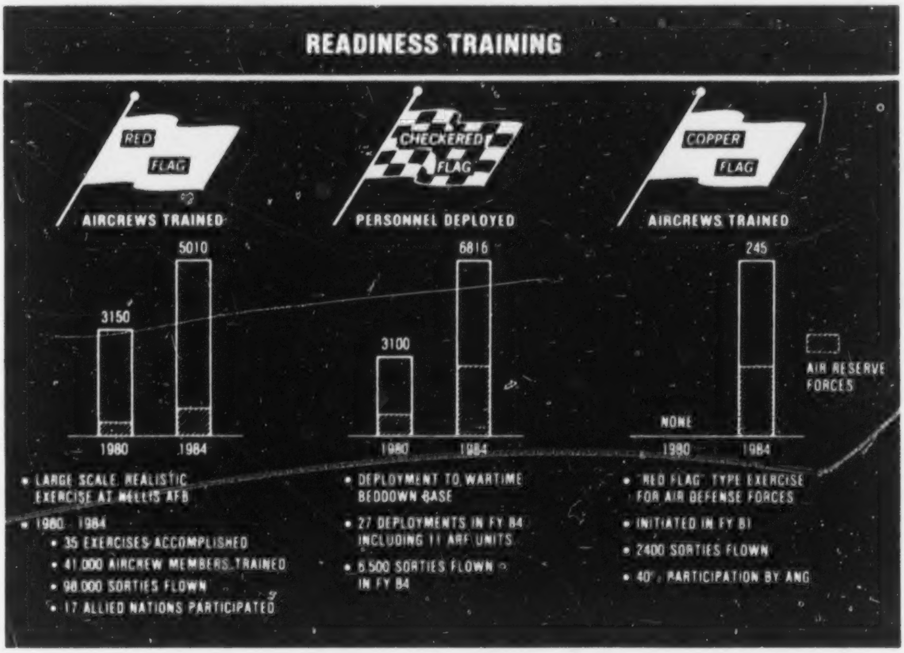
So the inventory of missiles depends on how fast we shoot those airplanes down. If in fact they come over in waves, then we could shoot a lot of them down at the first part of the war. If they do not, then the inventory lasts until we do engage. So it is a time sort of thing—I mean, it is a threat driven sort of thing rather than a number of days.

Senator Glenn. Don't you match, your best estimate, though, to match a 60-day war. You are providing your air-to-ground munitions for 60 days; when you match your air-to-air, would you not estimate what the 60-day requirement is?

General RUSS. Yes, but it is really not based upon a day's requirement. It is based upon an analysis of how many fighters he has and how many you have to shoot down to get air superiority, and that goes through the calculations of the PK's of each of the missiles and all of that sort of thing, and it is not done on a day basis. The ground attack ones are.

Chairman GOLDWATER. There is a relationship. It may not be exact, but for command purposes you should be able to estimate how many missions and about how long that would take.

General RUSS. Based upon our analysis of what the war would look like, which we all know may or may not happen, the number of required missiles that we are asking for to fight the 60-day war would enable us to fight a 60-day war assuming the Soviets employed the number of sorties that we think they would.



- LARGE SCALE REALISTIC EXERCISE AT NELLIS AFB
- 1980 - 1984
  - 35 EXERCISES ACCOMPLISHED
  - 41,000 AIRCREW MEMBERS TRAINED
  - 98,000 SORTIES FLOWN
  - 17 ALLIED NATIONS PARTICIPATED

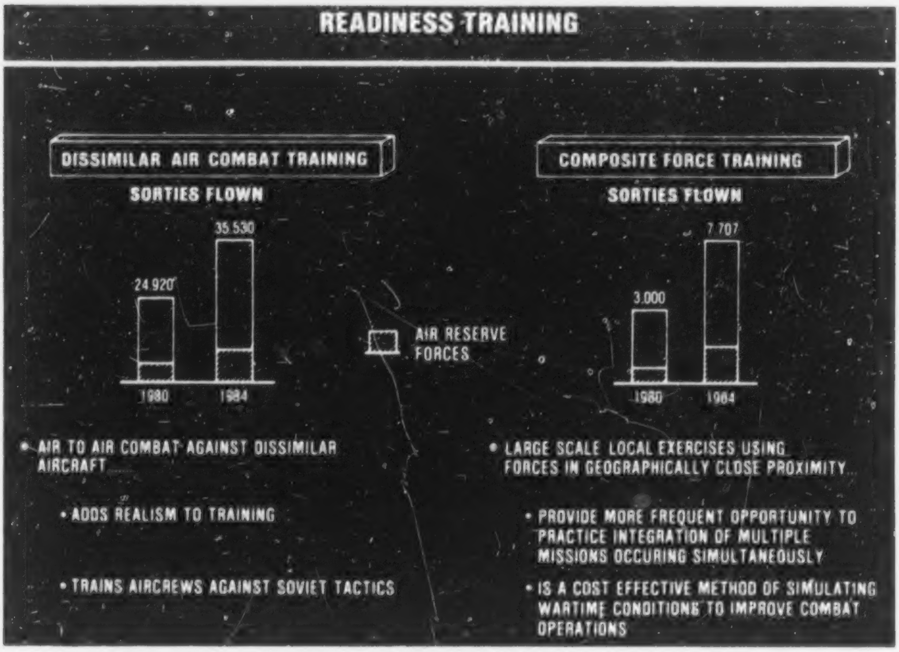
- DEPLOYMENT TO WARTIME BEDDOWN BASE
- 27 DEPLOYMENTS IN FY 84 INCLUDING 11 ARF UNITS
- 6,500 SORTIES FLOWN IN FY 84

- "RED FLAG" TYPE EXERCISE FOR AIR DEFENSE FORCES
- INITIATED IN FY 81
- 2400 SORTIES FLOWN
- 40% PARTICIPATION BY ANG

Now, in addition to increasing our flying time, that flying time is being used with more realistic training. Most of you are familiar with the kinds of things we do at Red Flag to provide more realistic training against the Soviet type threat array. You can see the increase in the crews trained between 1980 and 1984. You may be less familiar with some of our other flag programs, the Checkered Flag program deploys our units to typical wartime beddown bases overseas where those crews can become familiar with the facilities, terrain, weather, and kinds of rules that they have to fly under over there, and be able to meet the allies that will support and host them.

And then our Copper Flag program is a program very similar to Red Flag but it is done for our Continental Air Defense interceptor crews, and it is conducted at Tyndall Air Force Base, and we only began this in 1981, and this is the level of effort.

I should point out that the hatched areas indicate the amount of participation that the reserve forces have done in these kinds of exercises. You can see that they are doing their share.

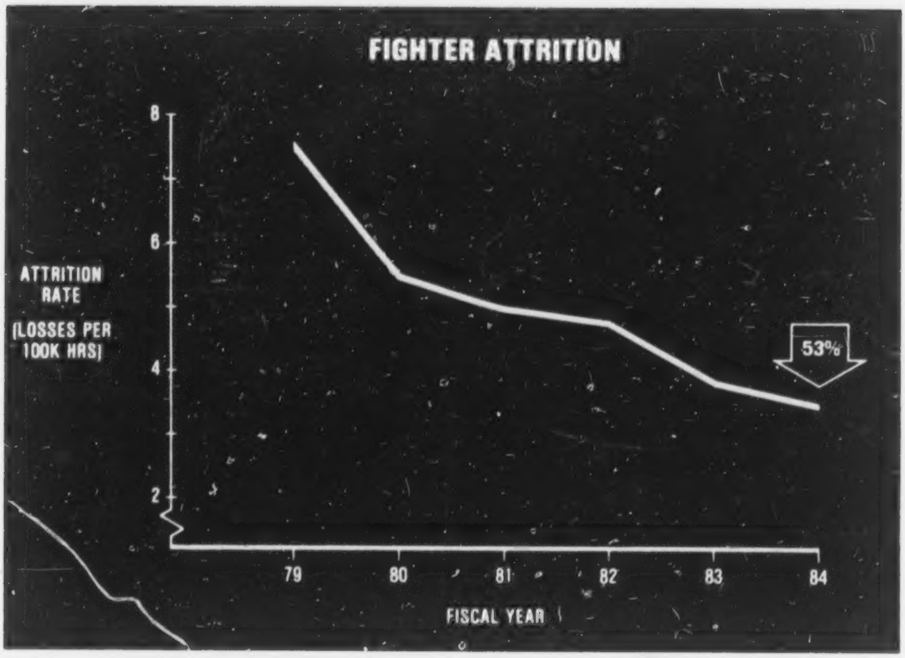


READINESS TRAINING

- AIR TO AIR COMBAT AGAINST DISSIMILAR AIRCRAFT
  - ADDS REALISM TO TRAINING
  - TRAINS AIRCREWS AGAINST SOVIET TACTICS
- LARGE SCALE LOCAL EXERCISES USING FORCES IN GEOGRAPHICALLY CLOSE PROXIMITY
  - PROVIDE MORE FREQUENT OPPORTUNITY TO PRACTICE INTEGRATION OF MULTIPLE MISSIONS OCCURING SIMULTANEOUSLY
  - IS A COST EFFECTIVE METHOD OF SIMULATING WARTIME CONDITIONS TO IMPROVE COMBAT OPERATIONS

We are emphasizing more realistic training at home. This shows the dissimilar air combat training sorties that we flew—many of these sorties are against aggressors. Others are done unit against unit so that F-15's may go against F-16's. It provides realism in our training and helps us train against Soviet kinds of tactics.

We also are increasing the number of large scale exercises we do at the home bases. We take several of the local or geographically close units, put them together in large scale exercises and do the same kinds of things that we do at Red Flag except that we don't have that simulated Soviet array to go against. It helps to increase the crews' awareness and complexity of doing more than just going to the range.



While we are doing this more realistic training, we have enjoyed a decrease in our peacetime loss rate. We set another record for this past year, and our total loss is 3.6 fighters per 100,000 hours flying time. We really think we could credit this to two things. First is the modernization for more capable, more reliable aircraft and second, the flying time has increased sufficiently for our crew so that they are doing this more realistic training in a safer environment.

And the F-15 contributes significantly to this in that it has achieved a 2.0 safety record, and that is the safest fighter record that we have had in our history.

Chairman GOLDWATER. Now, is that line your total line?

General ADAMS. This is fighters, all fighters, sir. This is all fighters, and you can see that we have decreased by about half the attribution that we have experienced per 100,000 flying hours since 1979.

Chairman GOLDWATER. How many years has it been since we purchased another tactical aircraft with equal attrition?

General ADAMS. It takes us about 55 to 60 aircraft a year to match this attrition, Senator Goldwater, and then of course, the other factor is age. In an effort to try to keep the average age of that fleet at some reasonable number, we have selected as a planning goal about 10 years. We will say in the road map that it takes about 260 aircraft a year to hold 40 tactical fighter wings at the average age of 10 years, and to provide for the peacetime attrition losses, and of course, we are not there. It has been about 4 or 5 years since we have achieved that number.

Chairman GOLDWATER. And we are going to do worse this year.

General RUSS. Sir, let me answer that. As you know, when we compute attrition figures, we really throw three things into the pie. The first, of course, is the number of airplanes we actually crash. The second is those that we attrite because of foreign military sales, as an example. We sell 36 airplanes to Egypt or so many F-4's to Turkey or what have you. They came out of the tactical forces, so they attrite to the tactical forces. And the third are those that attrite because of the age and they are no longer capable.

So when we put those all together, we come up with an overall attrition factor, and that is what General Adams is talking about, which is a requirement for 6.5 airplanes per year per wing.

Chairman GOLDWATER. The point I am trying to make and I have tried to make it for years, is that we are not gaining at all in tactical aircraft.

General RUSS. I think General Adams has a chart he will show you of where we are right now, and the only gains we get in force structure are the result of aging your force, and that is just a mathematical calculation. If you keep them around long enough, you are going to have a larger force. So we are aging the force, but we planned on doing that. We certainly would like to get the procurement levels up to about the 260 to 280 level, and we believe that would sustain us from now on, at the proper age. But the forces age differently. As you well know, we have peaks and valleys in what we have bought before.

So it is not an average distribution of age, and sometimes we come up with planning factors, and they change because of the 1 year we get a lot of production and the next year we get very little.

Chairman GOLDWATER. Well, what is your average age for your tactical aircraft, do you know?

General ADAMS. We are at about 9½ years now, Senator Goldwater.

Chairman GOLDWATER. That's fine.

Senator GLENN. What part of this would be accident attrition rate, then, according to what you said?

General RUSS. This is all accident attrition rate.

Senator GLENN. I thought you said your overall attrition included foreign sales, and that stuff you included in your attrition rate, but this would just be accidents.

General RUSS. This is just accidents. We didn't throw in the other ones that we lose, but we calculate those in coming up with our figures for how many aircraft we need to procure.

Senator GLENN. Thank you.

FIGHTER PROCUREMENT

General ADAMS. Now, sir, I would like to move to the fighter procurement, and we will discuss many of those areas we have just talked about and an update to the road map that was presented to this committee last year.

Senator GLENN. Before you go on, can I ask one other question? How about fatalities, air crew fatalities on the accident rate? Where do they fit in there?

General Russ. They are down significantly too, Senator, we are pleased to state. I don't have the exact figures, but our fatalities have gone down proportionately to the decline in accident rates.

Senator Glenn. Your attrition is just on airframes now, and this is not fatalities?

General Russ. It is not fatalities.

Senator Glenn. What would it be, a third of that or half of it or what?

General Russ. I would guess approximately 35 percent, but let me refine that figure for you.

Senator Glenn. Could you get that figure for us?

General Russ. I sure can, sir.

[The information follows:]

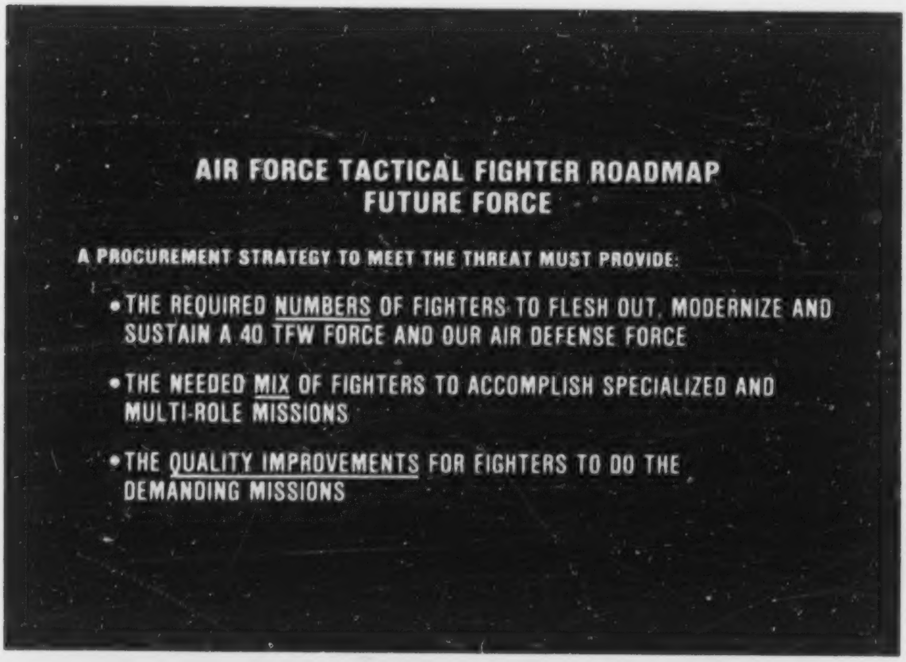
Aircrew Fatalities

Since 1980 Air Force fighter/attack aircrew fatalities have also continued to decline from 32 in 1980 to 22 in 1984. Specific numbers follow:

Fighter/attack aircrew fatalities

Year:	
1980	32
1981	31
1982	23
1983	25
1984	22

These figures represent a 67% survival rate in 1984 and are continuing to improve.



AIR FORCE TACTICAL FIGHTER ROADMAP
FUTURE FORCE

A PROCUREMENT STRATEGY TO MEET THE THREAT MUST PROVIDE:

- THE REQUIRED NUMBERS OF FIGHTERS TO FLESH OUT, MODERNIZE AND SUSTAIN A 40 TFW FORCE AND OUR AIR DEFENSE FORCE
- THE NEEDED MIX OF FIGHTERS TO ACCOMPLISH SPECIALIZED AND MULTI-ROLE MISSIONS
- THE QUALITY IMPROVEMENTS FOR FIGHTERS TO DO THE DEMANDING MISSIONS

General Adams. Last year we provided in the fighter road map, Senator, that these goals to grow to and sustain 40 tactical fighter wings and to modernize our air defense forces. While we are procuring that number of aircraft, we will ensure that it is the correct mix so that the commander in the field has the capability to do the job that he has to do, and at the same time, ensure that we are able to do those demanding missions on the high end of the combat spectrum when it is required.

[Charts deleted.]

First, let's look at the threat that we have to face, and this lays out the Soviet fighters, 1985. Each of these aircraft represents one wing. For example, [deleted]. The Flogger is shown here, and then the Foxbat Mig-25's and Mig-31's are shown here. This is a very capable force, and it becomes more and more sophisticated as they increase their inventory.

Now, let's look at what happens in 1990 as the intelligence people project.

[Chart deleted.]

You can see that the Mig-23 and Mig-27 Floggers begin to go out of the inventory, and we suspect that as they have done in the past, more modern aircraft are transferred to their allied or client states. We see then all of the Mig-21's which we declared as our principal threat in the late 1960's and early 1970's, all go out of the inventory. We see then that longer range capabilities are emphasized with heavier payloads and introducing more Fencers, and then two brand new airplanes that are shown here, the Flanker and the Fulcrum, and both of these aircraft have look-down/shoot-down capability. So while the size of the force does not change, the quality of that force continues to grow.

[Charts deleted.]

Here are other characteristics of these two new aircraft, and note that they achieve IOC for this aircraft in 1984, and we are looking for an IOC in this aircraft in [deleted]. Both carry semiactive radar missiles similar to our AIM-7s, and the intelligence projection is that they will have [deleted].

Here are the comparisons with the F-16 and the F-15.

[Chart deleted.]

And they are similar in capability to those two aircraft.

AIRBORNE WARNING AND CONTROL SYSTEM AIRCRAFT

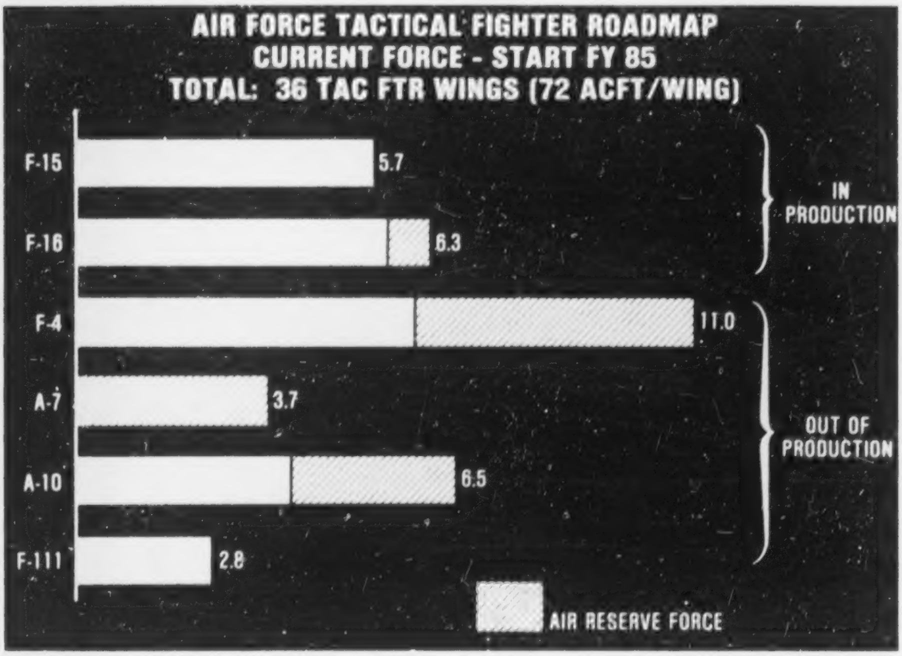
MAINSTAY

[Deleted].

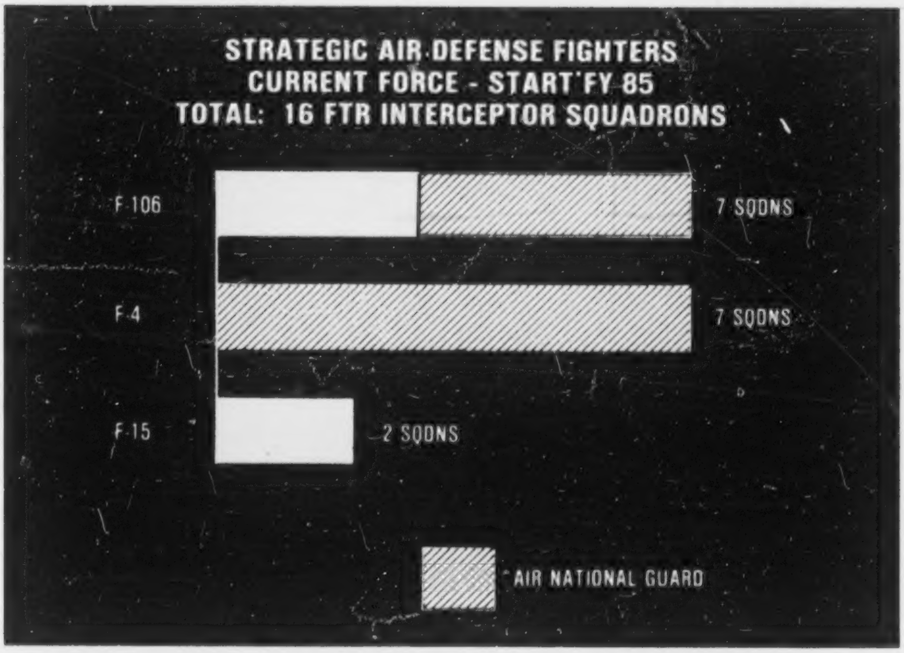
Digital data and communication links. Supports and controls offensive and defensive air. Operations (air-to-air and air-to-surface).

[Deleted].

Now, in addition to introducing those two look-down/shoot-down aircraft, we see them in the second generation of their AWACS. This is their old Moss AWACS. Here is their new Mainstay, and we are looking for IOC in [deleted] and again, that capability will be very similar to our AWACS. It provides them the ability to find those low altitude penetrators and provide the necessary command and control for those look-down/shoot-down fighters.



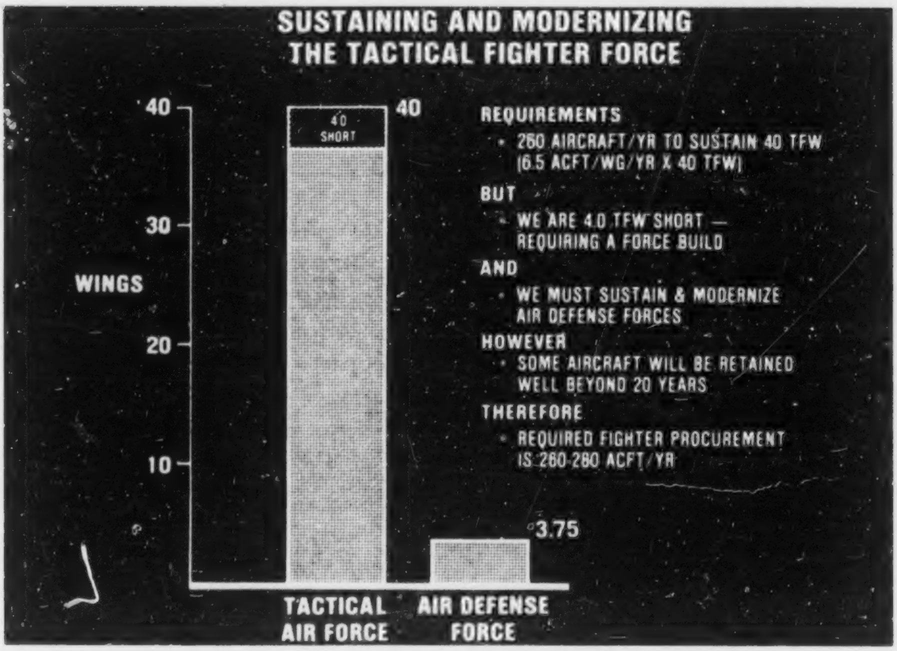
Now, let's look again at the composition of the U.S. Air Force, and we are at 36 tactical fighter wings, that is, 72 aircraft per wing. You know the capabilities of these aircraft are our air superiority F-15's, our multirole F-16's, and both of these are, of course, still in production. The bulk of our force remains F-4's, primarily in the air-to-surface role with some residual air-to-air capability. A-7's and A-10's for the most part are close air support, but have some interdiction capability. And then our long range all-weather/night time aircraft, the F-111, down to something less than three wings.



Here is the composition of our air defense force. We are at 16 squadrons currently of pretty old F-106's and F-4's, and we have introduced two new squadrons of F-15's into that force. You can see that two-thirds of that force is manned by the Air National Guard.

Chairman GOLDWATER. All right, now, what is the average age in that effort?

General ADAMS. It is about 17 years. We are going to show you our plans to correct that as we can, sir.



SUSTAINING AND MODERNIZING THE TACTICAL FIGHTER FORCE

REQUIREMENTS
- 260 AIRCRAFT/YR TO SUSTAIN 40 TFW (6.5 ACFT/WG/YR X 40 TFW)

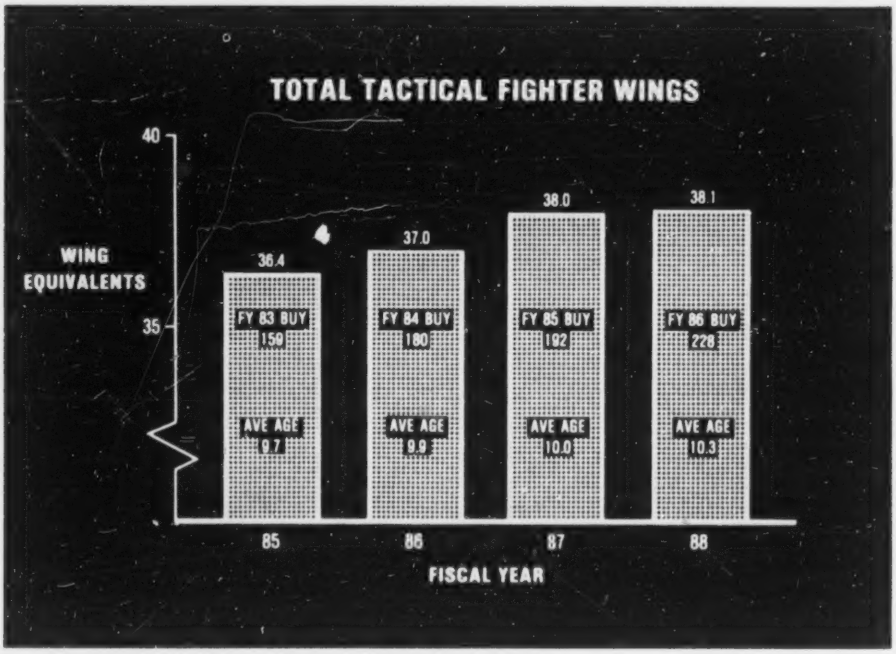
BUT
- WE ARE 4.0 TFW SHORT — REQUIRING A FORCE BUILD

AND
- WE MUST SUSTAIN & MODERNIZE AIR DEFENSE FORCES

HOWEVER
- SOME AIRCRAFT WILL BE RETAINED WELL BEYOND 20 YEARS

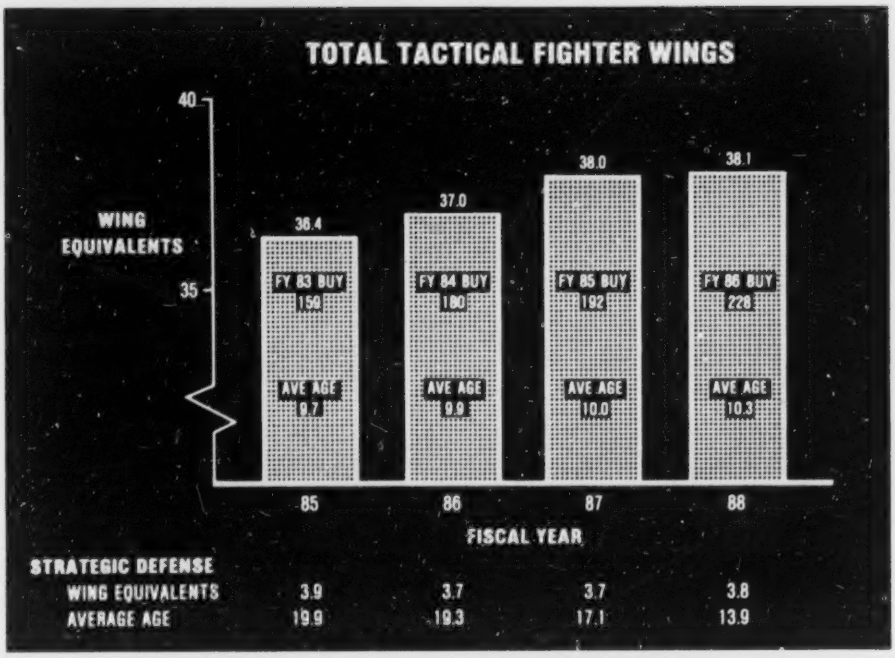
THEREFORE
- REQUIRED FIGHTER PROCUREMENT IS 260-280 ACFT/YR

You will recall, we said last year that it takes 260 aircraft per year to sustain a 40 tactical fighter wing force. Of course, we are four wings short. We also have to worry about modernizing the 3.75 wings of air defense force. We can do that by procuring 260 to 280 fighters a year, and we do that partly by maintaining a few of those aircraft beyond 20 years. The F-111 would be an example because it is a very capable airplane with lots of life left in it.



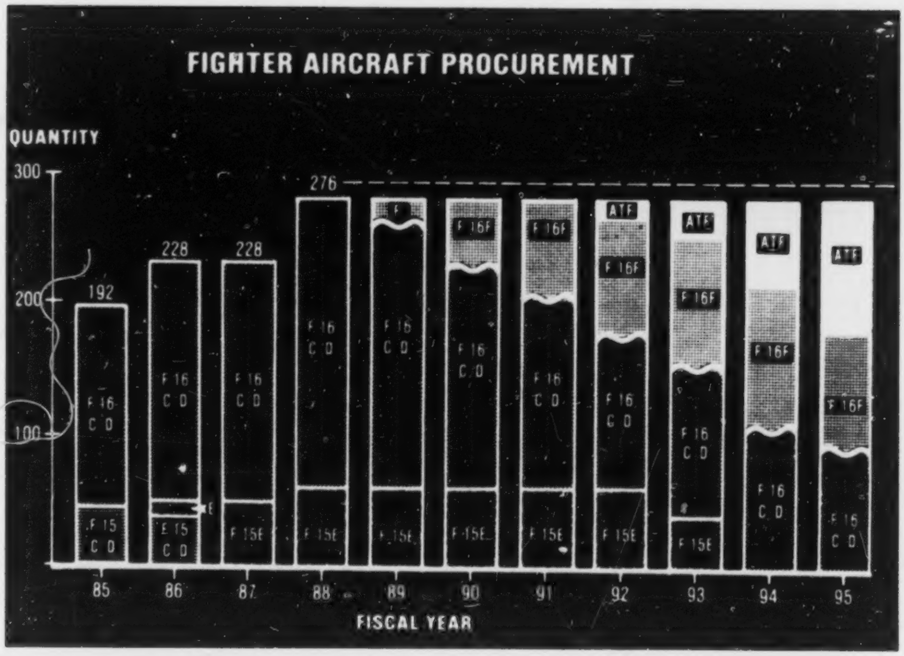
We talked earlier about our growth, and I would like to point out that at the end of 1985, we are looking for almost a half a wing's growth in our tactical forces. By 1987 we will be at 38 wings.

Now, what is important here is that the growth to 38 wings is done by the 1985 buy that has already been approved with 192 aircraft. Now, we have said that 192 is not sufficient to provide for constant average age while we are doing that growth. We do that by accepting an increase in the average age from 9.7 at the end of this year up to 10 years. Our request for this year is for 228 aircraft, and still that is not sufficient to maintain the average age of the fleet. We accept an additional increase in the age of 0.3 years in 1998.

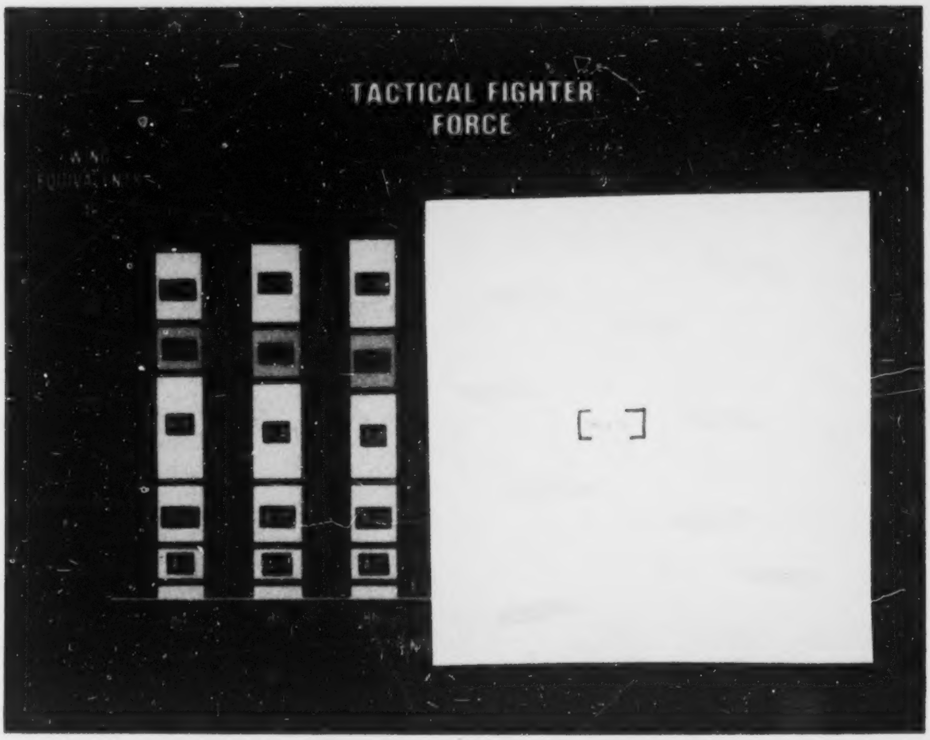


But at the same time, we are modernizing our strategic air defense forces, and you can see that we fall off, and I gave you a wrong number, Senator. It is 19.9 years, almost 20 years for the air defense force AGF, and we are able to put that down to 13.9 in 1988. So there is a significant modernization that occurs on the air defense force at the same time that we are trying to build and modernize in the tactical forces.

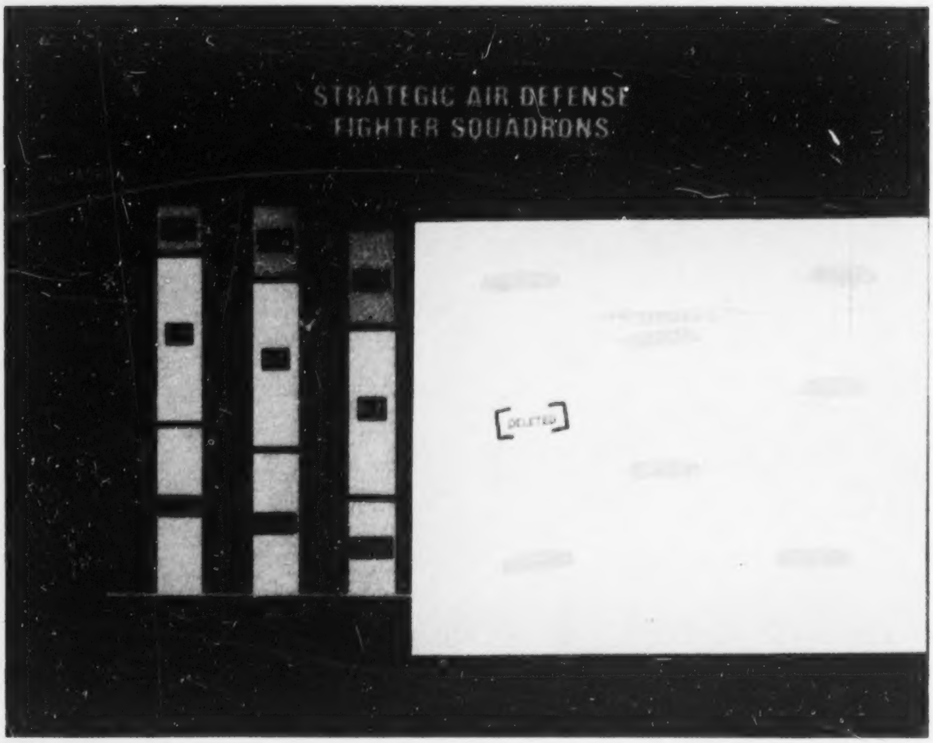
Dr. COOPER. That is a key chart, Senator, and I think it underscores the point that you made earlier about our fighter procurement rates. We are not moving as fast as we would like to, but thanks to the support that we have received from this committee at least, the trends are going in the right direction. We have gone from 159 to 228 this year where we are at 228, and each year we have bumped it up little by little. We would like to get to the 260 or 280 per year, but given the budget realities that we face, it is highly unlikely that we are going to be able to do that in the near term.



General Adams. Then this is an update of the procurement chart we showed you last year, Senator Goldwater. You will recall that we received approval for 192 aircraft. Our request this year is for 48 F-15's to include 8 E's, and 180 F-16's, with a similar request for next year. This is the last year of the F-15C's and D's, we plan for 392 F-15E's, finishing up their procurement in 1993. We look to introduce an evolutionary change to the model of the F-16, called the F-16F, out here in the procurement year of 1989. We have not exactly determined the mix between the C's and D's and the F's, and that is indicated by this wavy line. And then for our new air superiority fighter, we are looking for procurement in 1992 with a 1995 IOC.



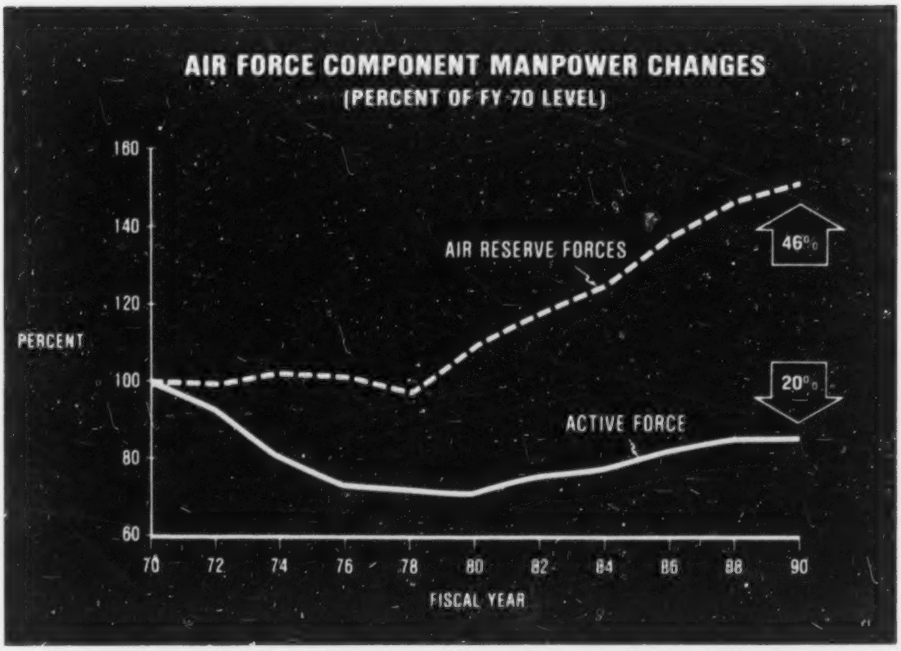
And here is how that force then falls out from the delivery standpoint. We are almost at 40 wings by 1990. We achieve 40 wings in 1991. As you can see, this wedge indicates the kind of modernization where more than half of our force will be F-15's and F-16's by that timeframe.



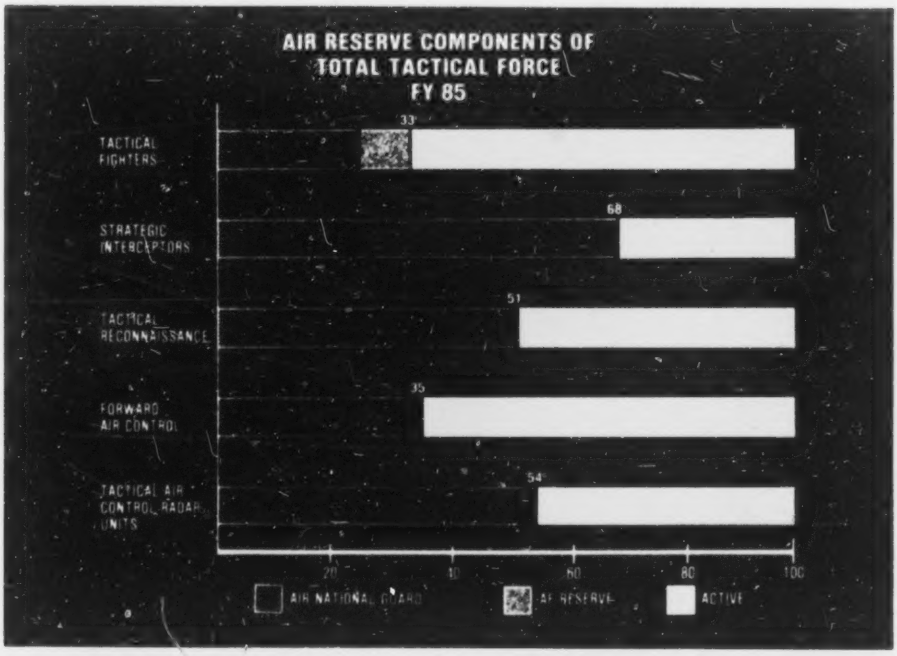
The same kind of modernization occurs in the air defense forces. We draw down the one squadron this year to 15 squadrons. The last F-106 will be gone here in 1987, and more than two-thirds of the air defense fleet will be F-15's and F-16's by the year 1990.

We also have a road map for our engines to go along with what we are trying to do with fighter procurement. In the near term you know that we have competed the F-100 and the F-110 engines, the Pratt & Whitney and GE engines, to improve our reliability and maintainability. We are very pleased with the levels of durability that those engines have achieved.

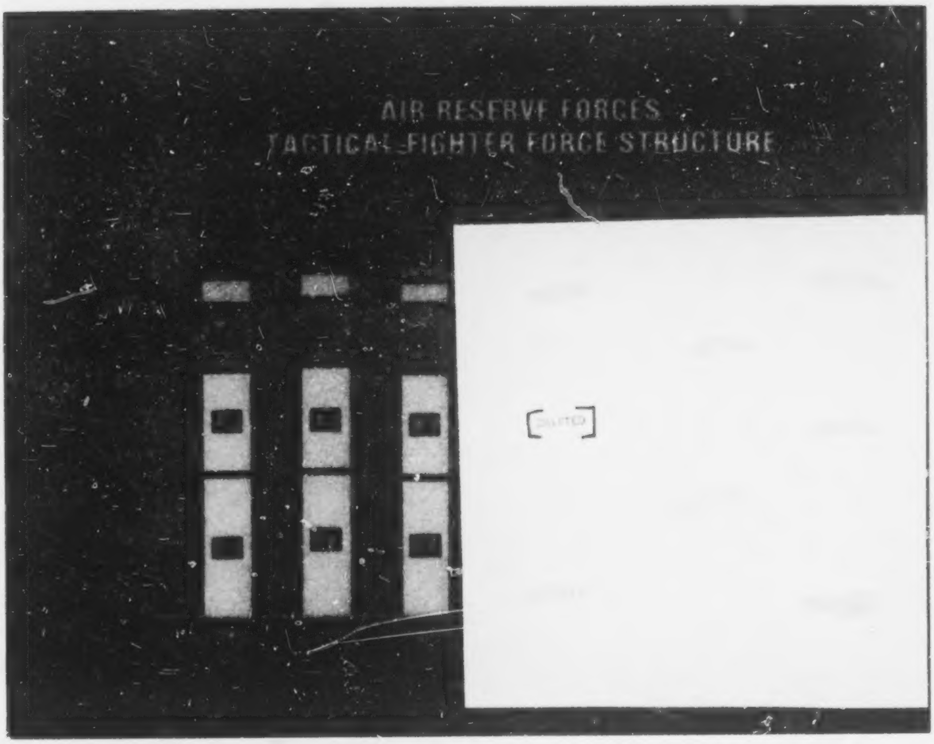
Our next goal is to compete those in the mid term while maintaining the same level of durability and provide for higher thrust to keep our aircraft competitive with the threat. And then in the longer term we have an ongoing development program for the JAFE engine which is a new technology engine for the advanced tactical fighter.



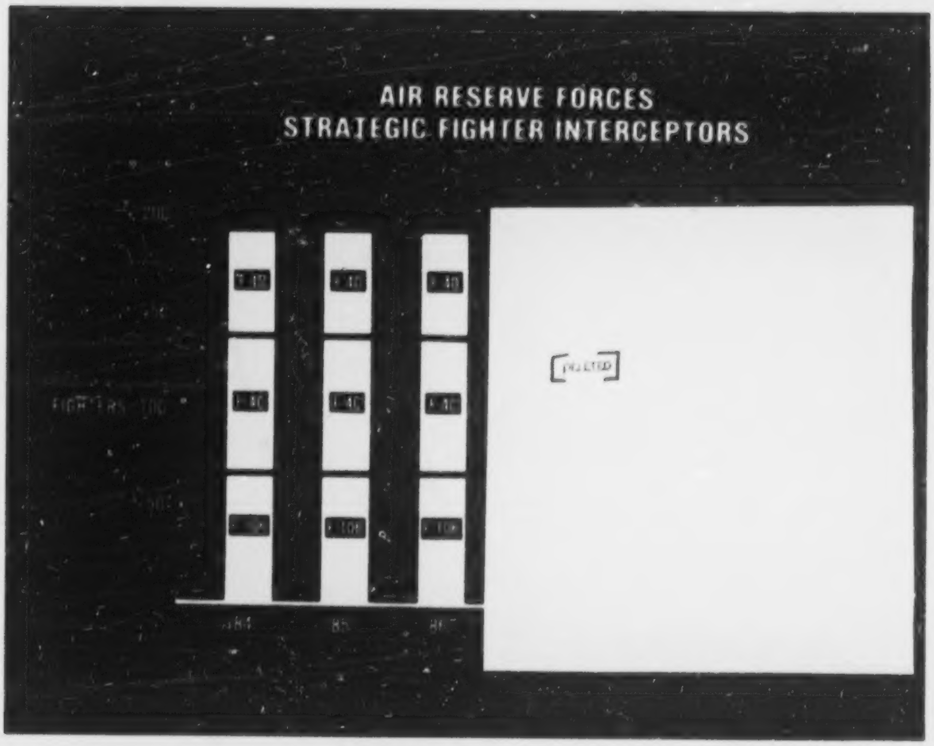
Now, I would like to talk just a minute about the vital role that the Air Reserve forces play in the total tactical force. The manpower numbers have continued to increase at a significantly greater rate in the reserve forces than in the active, and this is a baseline of 1970 for these numbers. However, if you started here at about 1981, you would see that this line is about twice the rate of growth as for the active force.



A third of our tactical fighters are in the Air Reserve and Air National Guard; two-thirds of our strategic interceptors; and tactical reconnaissance aircraft, about half of those are in the Guard and Reserve; forward air controllers, one-third, and more than half of our tactical radar. So you can see there is a large amount of support required for our tactical forces that come from the Air Reserve forces.



Here is how that modernization works out. They continue to grow, and this is an increase of about 120 aircraft from 1984 to 1990, and you can see that almost half of their forces then will be F-15's, F-16's, and A-10's. These are the tactical forces.



And here is how the Air Defense force looks. The Air Defense force will end up with more than half of their force by 1990 being F-16's.

Chairman GOLDWATER. What is the maintenance rate in the Reserve and Guard? Is it comparable to the regular?

Colonel PHILLIPS. Sir, I would like to provide that for the record, but as a general rule, sir, the quality of the technicians in the Reserves, because of longevity, etc., is quite high.

I can provide you, sir, for the record, some more specific data on that.

Chairman GOLDWATER. That is fine. I think that is very, very necessary.

[The information follows:]

AIRCRAFT MAINTENANCE RATES

Not mission capable maintenance (NMCM) rates are generally indicative of the maintenance capability within a unit. However, no direct comparison can be drawn between the active and the reserve forces. While it is true that reserve force maintenance personnel are generally more experienced, especially the full-time force, the full complement of maintenance personnel is not available on a day-to-day basis. The full-time workforce is approximately one third of the total maintenance authorizations. Additionally, the reserve force units are geographically separated squadron size (17/24 aircraft) while the active force is organized in wing size (72 aircraft) units consisting of three squadrons. Further, the reserve forces have only about one year of experience with the F-16 (one squadron in the Guard and one squadron in the Reserve) and no experience with the F-15. With these disparities in mind, the following FY 84 data is presented for information only:

NMCM RATES

	F-16	A-10
ARF	26.5	14.5
Active	11.2	7.9

General RUSS. Sir, I might comment on that because, historically, the Air National Guard and Air Reserve mission capable rates have been significantly higher than the average, primarily because of the experience that they have in the units, but with the advent of some of our new airplanes with higher reliability, we are experiencing in the active force probably the highest mission capable rates we have ever had before in the history of tactical aviation.

Last year alone our overall F-16 rate was around 80 percent, and unheard of in-commission rate such as England Air Force Base flying the A-10 with well over 90 percent for the full year.

These sorts of figures are just mind boggling to me, and I know to you, because in the days when we were flying those airplanes, it was a lot less. And so we are making a concerted effort to put more and more reliability into them, and it is evident by what is happening.

RESERVE TACTICAL FORCES

Senator GLENN. Could you go back a chart or two there and see the percent of your tactical forces that are in the Reserve? I was surprised it was as high as it was.

General RUSS. Actually, it is a third of our fighter forces.

General ADAMS. A third of our fighter forces and two-thirds of the Strategic Air Defense forces, and then half of the tactical reconnaissance, a large portion of our forces, our tactical forces, are provided by the ARF.

General RUSS. Let me add to that because sometimes people get the impression that the Air Force is not providing modern munitions and modern facilities and modern aircraft for our reserve forces. It is just not so. And we rely upon our reserve forces. We cannot fight a war without them, and therefore we have to modernize them to keep them in quality equipment.

We have modernized and put probably as much as we can in the reserve forces. In fact, the Reserves have told us they are already presented with a very challenging growth rate in their programs. You have to maintain a certain balance, as you well know, Senator Glenn, between the Actives and the Reserves. We think we are about there. We don't think there is much left in that.

Senator GLENN. What I was thinking about was, as you are aware of, some of the old Army complaints about how the Air Force wants to go high and fast and couldn't care less about TAC Air Force supporting the troops out there. I was sitting here wondering, after I saw these figures and mulled them over for a couple of minutes, whether this doesn't give them a little good fodder there because the Reserves are not—I mean, there is a delay before reserve forces come in, and your TAC fighters that are in the regular force, your TAC airplanes are the ones that are ready to go now, and I wondered whether the shift off the Reserve for the bulk of those forces is really the balance that you want.

General Russ. Sir, today we have a requirement for the Reserves to be able to follow the Active by 24 hours. We give them 24 hours to mobilize, and then they have to meet the same time lines as the active, and we stress them, we give them operational and readiness inspections, we deploy them overseas, and they are as ready as the Active Forces.

So it is just 1 day and that is all.

Now, previously we had mobilization periods of several weeks before they are ready. That is no longer the case.

Senator Glenn. Do your ORI's come out as high with the Reserves?

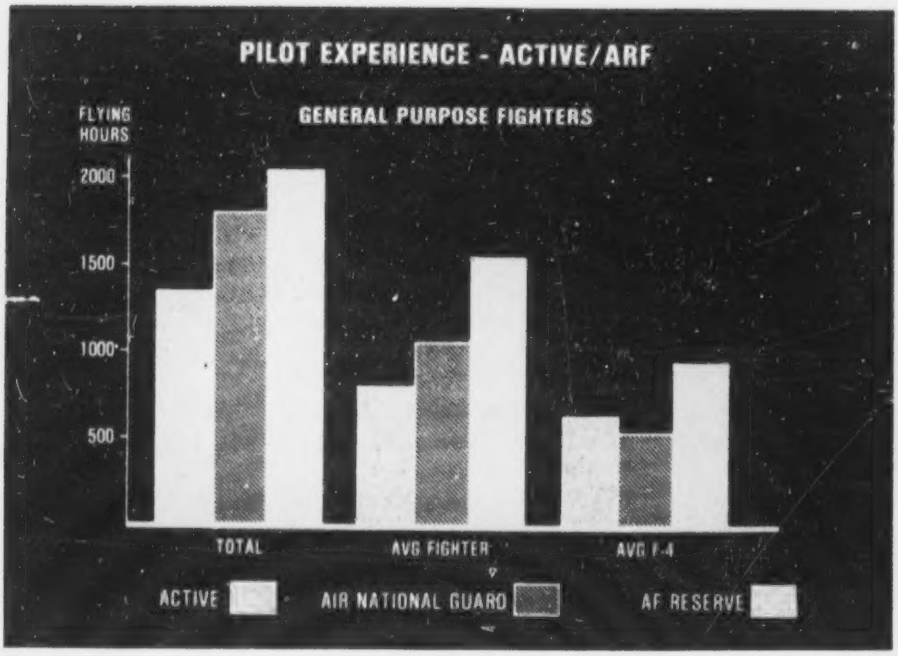
General Russ. Yes, sir, they do. They qualify to the same standards as the active as far as their bombing is concerned. They qualify to the same requirements in their inspections. They are a first rate outfit, all of them.

Senator Glenn. I do not want to be facetious here, but if that is the case, if they are every bit as qualified and they live at home all the time, why don't we go to an all-Reserve Force?

That is overstated, obviously.

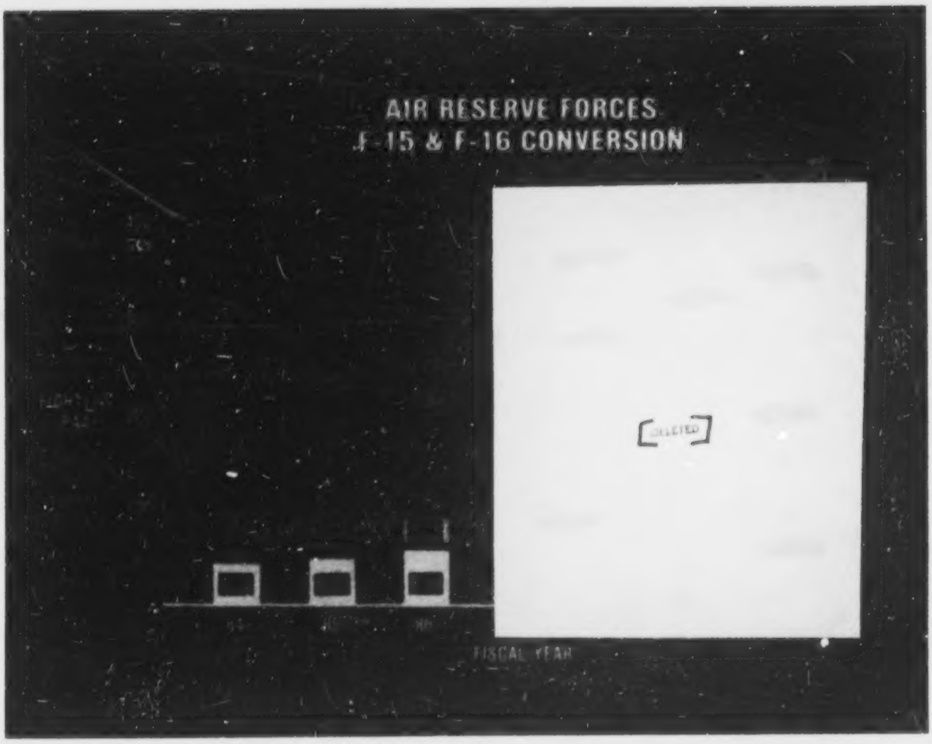
General Russ. I don't know how many Reserves would want to live in Germany and Japan and Korea and a few other places. So there is a certain balance you have to maintain and a certain rotational balance you have to maintain between the actives overseas and the actives in the States, and I guess what I am trying to say is that the balance that we have struck here I think is about all that we can do. We are talking in ones and twos now. We are not talking in big changes.

Chairman Goldwater. Wouldn't you be right in saying that the average lifetime of the Guard would be above the regular outfits, and the Reserve I don't know about, but I think the Guard is above.



General ADAMS. This shows the composite of our average fighter and our average F-4 experience, Senator. Here we are with the Active Force. That is this line for total fighter operation. Here we are—I am sorry, for total aircraft, and here we are with the National Guard and the Reserves. So you can see in general these are the totals. If you break that down to fighters, this includes our airlift and our tanker operations. If you break that down to fighters, you can see again that the Guard and the Reserve have a significant increase over experience of the Active Force.

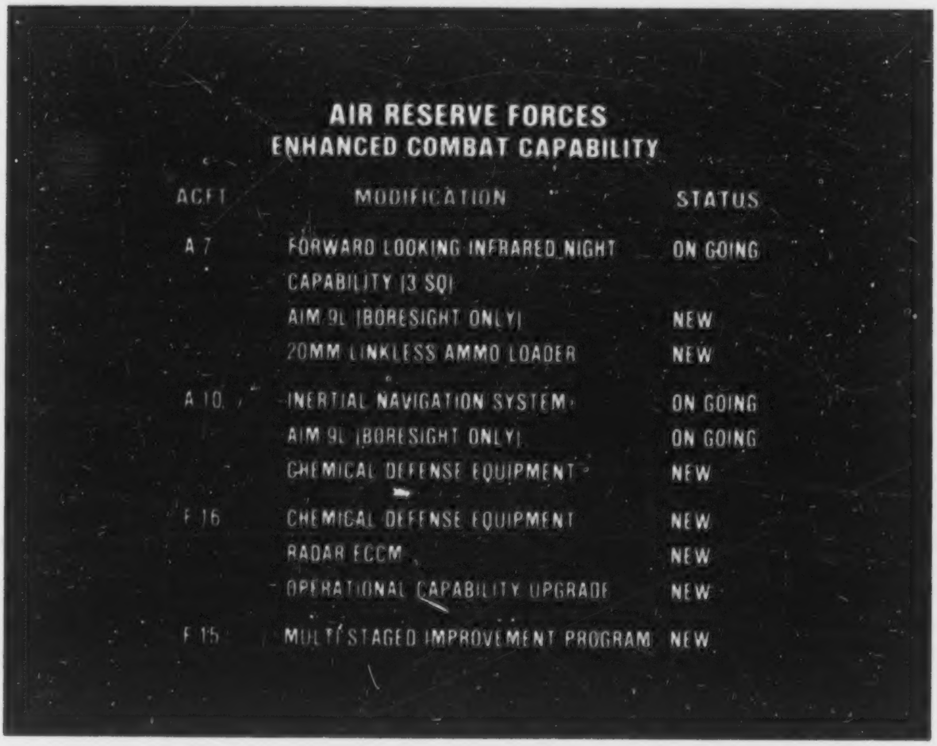
Now, there are a few anomalies here, particularly in the F-4 in this case, because we have had this airplane around a long time, and we have a lot of experienced people with F-4 flying time, but in general this statement is true, that the experience level in the Guard and Reserve is higher than the active fighter force.



AIR RESERVE FORCES
F-15 & F-16 CONVERSION

Now, this slide shows the amount of transition that we have talked about in terms of modernizing the Guard and Reserve. And you can see that there is a significant amount of conversion that will be going on in the next several years in those areas. We currently have two F–16 units on line. We introduced the F–15 for the first time in the Reserve Forces this year with one unit, and another squadron here, and then the F–16's continue to grow at a significant rate. So you can see that more than 400 aircraft are absorbed from a conversion standpoint in the Guard and Reserve by the year 1990.

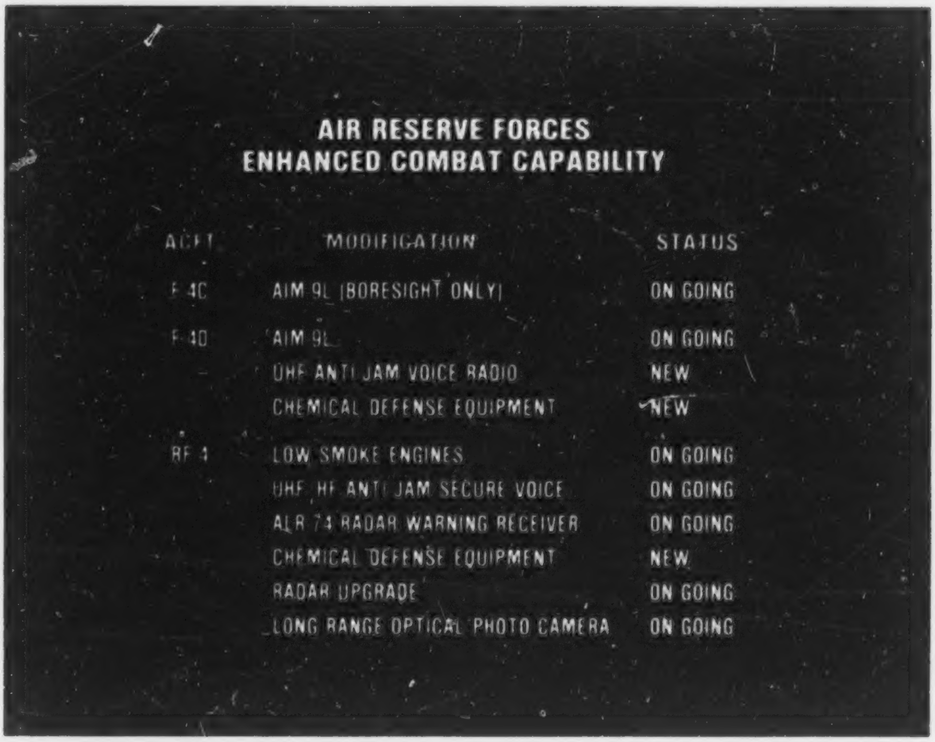
We think this is a tremendous training load but a manageable training load for the Guard and Reserve to pick up.



AIR RESERVE FORCES
ENHANCED COMBAT CAPABILITY

ACFT	MODIFICATION	STATUS
A 7	FORWARD LOOKING INFRARED NIGHT CAPABILITY (3 SQ)	ON GOING
	AIM 9L (BORESIGHT ONLY)	NEW
	20MM LINKLESS AMMO LOADER	NEW
A 10	INERTIAL NAVIGATION SYSTEM	ON GOING
	AIM 9L (BORESIGHT ONLY)	ON GOING
	CHEMICAL DEFENSE EQUIPMENT	NEW
F 16	CHEMICAL DEFENSE EQUIPMENT	NEW
	RADAR ECCM	NEW
	OPERATIONAL CAPABILITY UPGRADE	NEW
F 15	MULTI STAGED IMPROVEMENT PROGRAM	NEW

Not only are we buying new aircraft, but we are continuing to modernize and modify the Guard and Reserve aircraft just as we are in the active, and these are some things we are doing to the A-7's, the A-10's, the F-16's and the F-15's, and we are doing the Guard and Reserve aircraft as we are doing our own. Ongoing means we are doing it now and new means that it is an 1986 or 1987 new start.



AIR RESERVE FORCES
ENHANCED COMBAT CAPABILITY

ACFT	MODIFICATION	STATUS
F 4C	AIM 9L (BORESIGHT ONLY)	ON GOING
F 4D	AIM 9L	ON GOING
	UHF ANTI JAM VOICE RADIO	NEW
	CHEMICAL DEFENSE EQUIPMENT	NEW
RF 4	LOW SMOKE ENGINES	ON GOING
	UHF HF ANTI JAM SECURE VOICE	ON GOING
	ALR 74 RADAR WARNING RECEIVER	ON GOING
	CHEMICAL DEFENSE EQUIPMENT	NEW
	RADAR UPGRADE	ON GOING
	LONG RANGE OPTICAL PHOTO CAMERA	ON GOING

And then these are some of the things that we are also doing for the F–4's and the RF–4's. So not only are we buying new aircraft, but we are continuing to modernize the aircraft by providing modifications to them.

That concludes my part, Senator Goldwater, for these three areas.

And now Maj. Gen. Mac Williams, Director of Operational Requirements, will provide details on the selected programs as requested by your staff.

Chairman Goldwater: Thank you very much, General.

Senator GLENN. Could I ask before you leave, just one second, do the Reserve F–16's have radar missiles or plan to use them, Sparrows?

General RUSS. The current reserve F–16's are in the tactical force and not in the air defense forces, but they do not have the capability to fire the AIM–7 missile at this time.

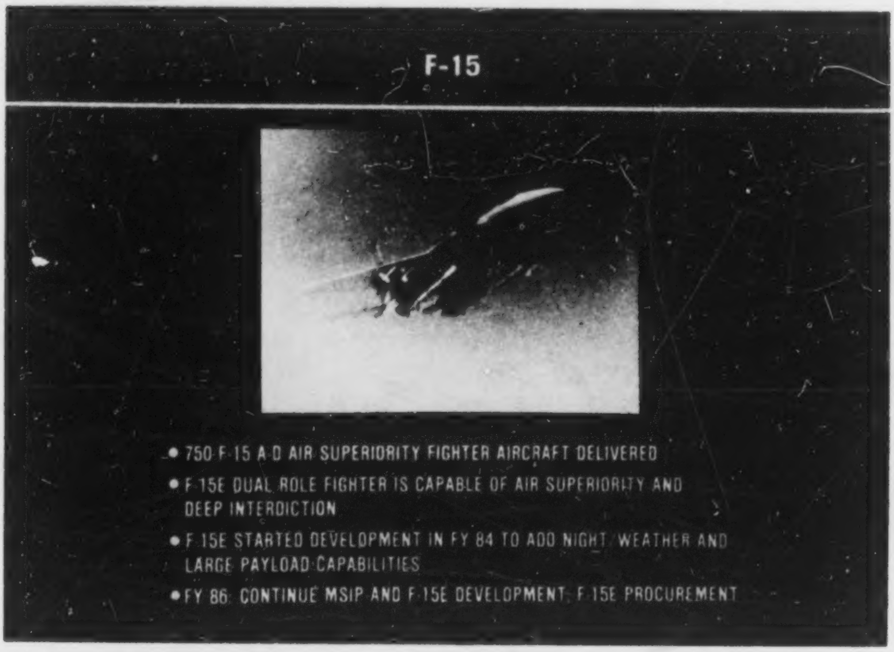
Senator GLENN. Do you plan to try to put that on them?

General RUSS. We have proposed a modification to the airplanes, to all of the 256 F–16's that would go into the air defense role. We have proposed a modification to put the AIM–7 on them. That has not been completely staffed within the building as yet, but the Air Force proposition would do that. It would cost about half a million dollars an airplane to do that. The airplanes currently have a significant portion of the group A components in them, and we would have to finalize a few things and put the group B components in, but we believe that would be a wise thing to do.

Senator GLENN. Thank you.

Dr. COOPER. Senator, as I am sure you know, none of our F-16's have a radar missile at present, and that is the reason AMRAAM is so critical. AMRAAM is the radar missile that we intend to put on the F-16.

Senator GLENN. OK.

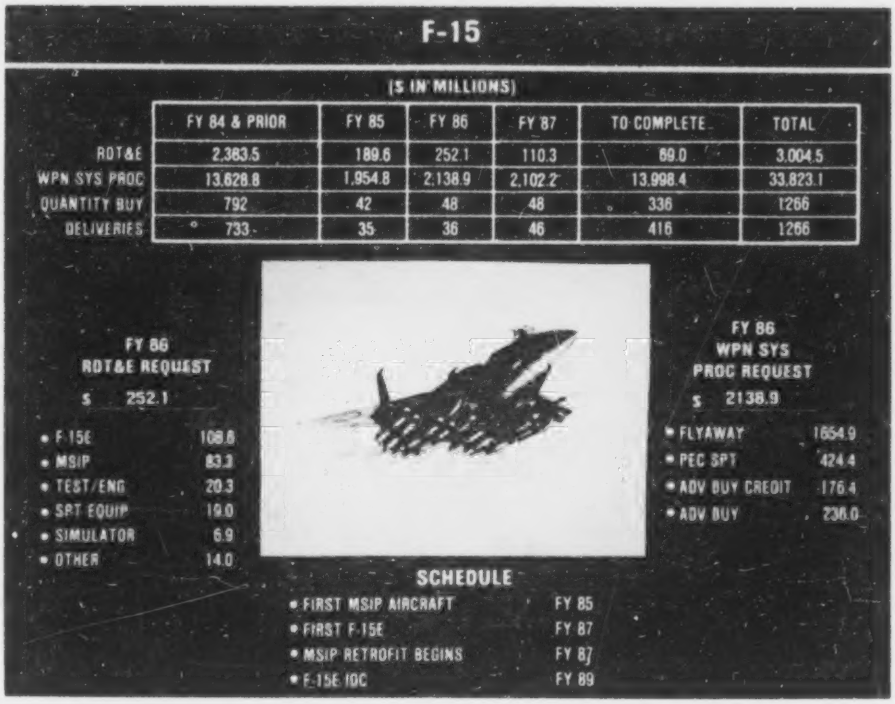


F-15

- 750 F-15 A-D AIR SUPERIORITY FIGHTER AIRCRAFT DELIVERED
- F-15E DUAL ROLE FIGHTER IS CAPABLE OF AIR SUPERIORITY AND DEEP INTERDICTION
- F-15E STARTED DEVELOPMENT IN FY 84 TO ADD NIGHT/WEATHER AND LARGE PAYLOAD CAPABILITIES
- FY 86: CONTINUE MSIP AND F-15E DEVELOPMENT; F-15E PROCUREMENT

General WILLIAMS. Mr. Chairman, Senator Humphrey, Senator Glenn, I am Mac Williams. I appreciate the opportunity to cover for you some of the more specific programs we understand you are interested in. We have several of them this morning, the F-15, which would include the F-15C/D, and the F-15E, the F-16F, the advanced tactical fighter. We will mention some more specifics about engines, AMRAAM, combat identification, some of the advanced communication systems, the Lantirn, and then we will look at a short film, as Dr. Cooper mentioned earlier.

First, though, we would like to look at, as General Adams said, the safest fighter in Air Force history, and that is the F-15. We now have more than 750 delivered in the field, and we think it is a real success story for our combat forces and modernization of the tactical fighters. In fact, it has been so good that we are looking into some modernization in terms of the F-15E which will give us an enhanced capability in terms of range and payload at night and under the weather capability.



F-15

(\$ IN MILLIONS)

	FY 84 & PRIOR	FY 85	FY 86	FY 87	TO COMPLETE	TOTAL
RDT&E	2,383.5	189.6	252.1	110.3	69.0	3,004.5
WPN SYS PROC	13,628.8	1,954.8	2,138.9	2,102.2	13,998.4	33,823.1
QUANTITY BUY	792	42	48	48	336	1266
DELIVERIES	733	35	36	46	416	1266

FY 86
RDT&E REQUEST
\$ 252.1

• F-15E	108.8
• MSIP	83.3
• TEST/ENG	20.3
• SPT EQUIP	19.0
• SIMULATOR	6.9
• OTHER	14.0

FY 86
WPN SYS
PROC REQUEST
\$ 2138.9

• FLYAWAY	1654.9
• PEC SPT	424.4
• ADV BUY CREDIT	176.4
• ADV BUY	236.0

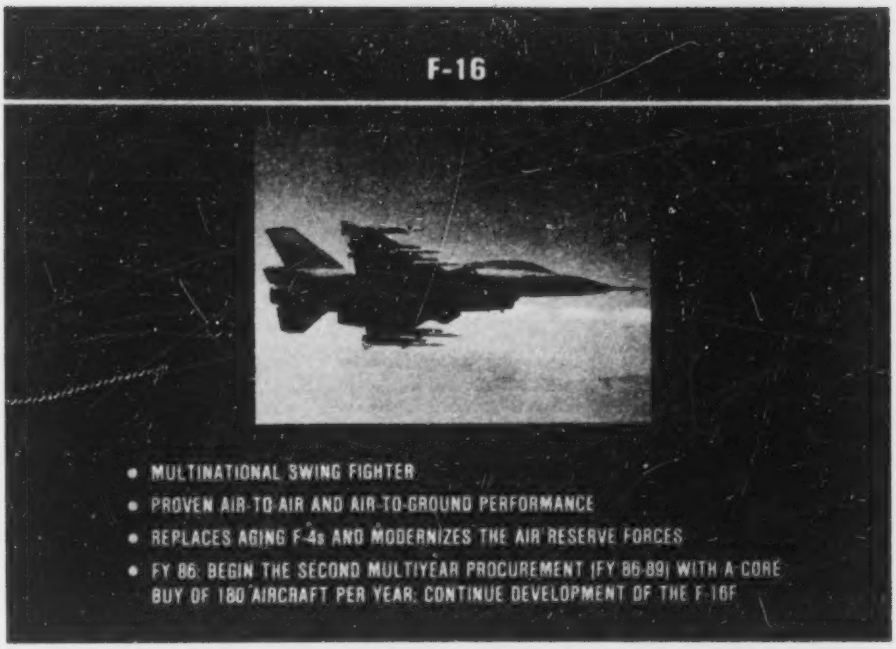
SCHEDULE

• FIRST MSIP AIRCRAFT	FY 85
• FIRST F-15E	FY 87
• MSIP RETROFIT BEGINS	FY 87
• F-15E IOC	FY 89

In this year, fiscal year 1986, we are asking for the last 40 of the air-to-air version of the F-15. We are looking for eight of the F-15E. Within the F-15E we hope to improve upon the avionics missionize of the cockpit. There will be a two-seat aircraft to give it the capability to do all of the variety of missions that we plan for it to do at night using the Lantirn capabilities, which I will talk about a little bit later, and with the laser guidance and to move then toward an IOC for the F-15E of 1989.

We are very confident that we have a good program here. We are looking forward to seeing the airplane in the air.

The F-15E will give us the range and payload in order to augment the F-111 force at night and adverse weather or limited weather. It will incorporate night vision, the automatic terrain following, which gives it the capability to elude and evade enemy defenses, and a high precision of bombing accuracy, including laser guidance. It will, however, retain a large majority of its air-to-air capability, which gives us the capability to have a dual-role as it has been advertised, and then we will look at a 1989 IOC. We are looking for a total of 392 of these aircraft at this time.



F-16

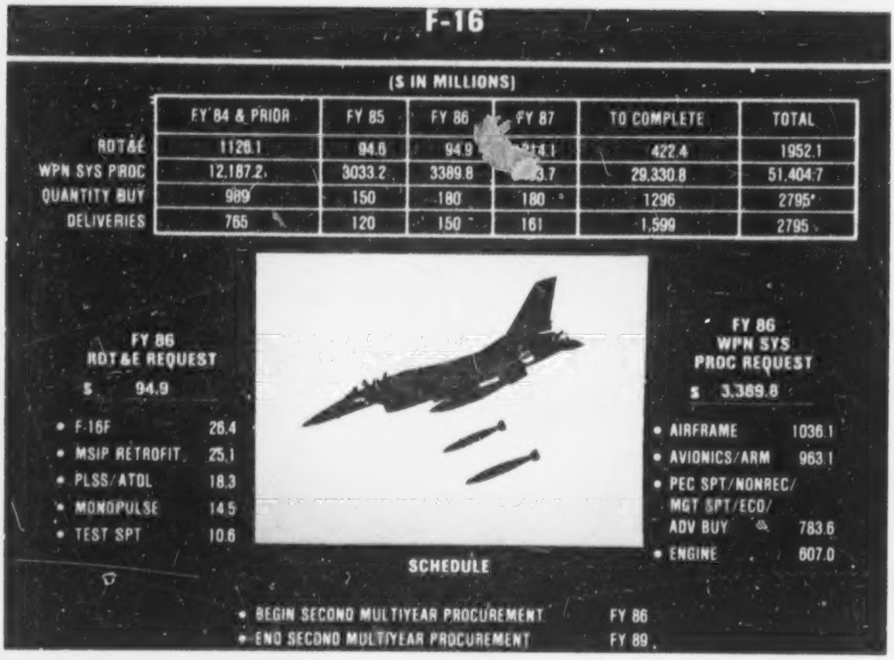
- MULTINATIONAL SWING FIGHTER
- PROVEN AIR-TO-AIR AND AIR-TO-GROUND PERFORMANCE
- REPLACES AGING F-4s AND MODERNIZES THE AIR RESERVE FORCES
- FY 86: BEGIN THE SECOND MULTIYEAR PROCUREMENT (FY 86-89) WITH A CORE BUY OF 180 AIRCRAFT PER YEAR; CONTINUE DEVELOPMENT OF THE F-16F

Moving now into the F-16, which is once again to put it in terms of safety, it is the safest single engine fighter in Air Force history. We have more than 814 of these aircraft now deployed worldwide in nine air forces, including the United States. It has a proven air-to-air and air-to-ground performance. It does replace the aging F-4's. We will begin the second multiyear procurement this year. We estimate savings due to multiyear, in the 1986 to 1989 buy of $313 million. We will be smart to do that. We will be moving up to a buy of 180 aircraft in 1986.

Dr. Cooper. Let me make a point, if I might, Mac.

Mr. Chairman, as you know, we have had a consortium that has been together for almost 10 years now that has been co-producing the F-16. The United States joined with Norway, Belgium, the Netherlands and Denmark. That original buy was for a total of 998 F-16's, 650 of which were procured by the United States and the remaining 348 by those four countries. I had the pleasure 3 weeks ago to represent the United States at the rollout of the final 348th European produced aircraft. I think that truly has been a remarkable program, and I think just a terrific example of international cooperation.

The consortium will stay together, but it has now evolved into a series of bilateral buys. The Netherlands and Belgium have both signed up to follow-on buys, and they are going to coproduce those. The Danes are about to sign up, and hopefully the Norwegians at some time in the future. That has been a remarkable success story, and we now have 998 aircraft coproduced.



F-16

($ IN MILLIONS)

	FY 84 & PRIOR	FY 85	FY 86	FY 87	TO COMPLETE	TOTAL
RDT&E	1126.1	94.6	94.9	214.1	422.4	1952.1
WPN SYS PROC	12,187.2	3033.2	3389.8	[illegible]	29,330.8	51,404.7
QUANTITY BUY	989	150	180	180	1296	2795*
DELIVERIES	765	120	150	161	1,599	2795

FY 86
RDT&E REQUEST
$ 94.9

• F-16F	26.4
• MSIP RETROFIT	25.1
• PLSS/ATDL	18.3
• MONOPULSE	14.5
• TEST SPT	10.6

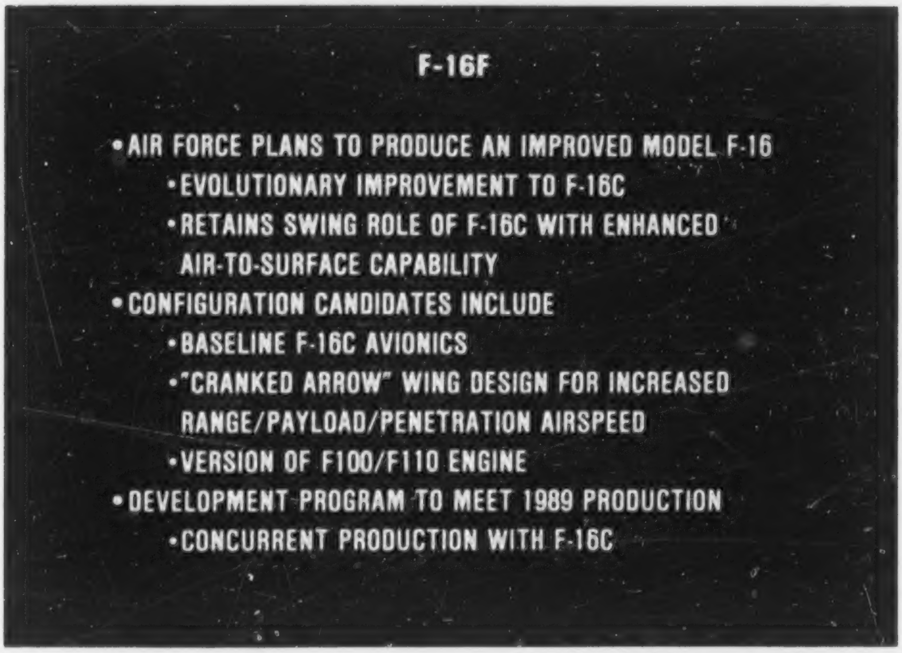
FY 86
WPN SYS
PROC REQUEST
$ 3,389.8

• AIRFRAME	1036.1
• AVIONICS/ARM	963.1
• PEC SPT/NONREC/ MGT SPT/ECO/ ADV BUY	783.6
• ENGINE	607.0

SCHEDULE

• BEGIN SECOND MULTIYEAR PROCUREMENT	FY 86
• END SECOND MULTIYEAR PROCUREMENT	FY 89

General WILLIAMS. More specifically, in terms of dollars and cents, we are looking to a little over $3 billion for our procurement in fiscal year 1986 to buy the 180. There will be 150 delivered from last year. The F-16F RDT&E program is moving along. I will talk a little more about that in just a moment, but we feel this aircraft with this multiyear approach is really paying off for us both in terms of performance as well as affordability, and it does offer us the opportunity for growth as represented by a look at the F-16F capabilities.



F-16F

- AIR FORCE PLANS TO PRODUCE AN IMPROVED MODEL F-16
  - EVOLUTIONARY IMPROVEMENT TO F-16C
  - RETAINS SWING ROLE OF F-16C WITH ENHANCED AIR-TO-SURFACE CAPABILITY
- CONFIGURATION CANDIDATES INCLUDE
  - BASELINE F-16C AVIONICS
  - "CRANKED ARROW" WING DESIGN FOR INCREASED RANGE/PAYLOAD/PENETRATION AIRSPEED
  - VERSION OF F100/F110 ENGINE
- DEVELOPMENT PROGRAM TO MEET 1989 PRODUCTION
  - CONCURRENT PRODUCTION WITH F-16C

We need more range and payload, in order to give it the capability to swing in the air-to-ground capability, and we think the F-16F is the way to do it, with the "cranked arrow" wing. We are looking to baseline the avionics, employing an enhanced range and payload up to about 600 nautical miles with an improved engine. We will look to meet a 1989 IOC.

We are very sensitive, though, in this program, Senator, to affordability issues and being sure we can figure the aircraft to meet the precise mission requirements.

General RUSS. Sir, I might add that the money that we have this year, which is $20 million plus, will be used to finalize the exact configuration of that aircraft. We believe that the baseline avionics will be the current avionics that we have in the F-16, and it appears that the "cranked arrow" wing will probably be the way to go, but we haven't made a final decision on that.

As you know, we are still testing the first two airplanes at Edwards, and we are doing some analysis to see what we can get in the airplane, what the overall cost will be and to make sure it will fit within our budget.

General WILLIAMS. As General Russ described, sir, in prefull-scale development, we will be looking at those items, the cockpit simulation will be a single seater, wind tunnel testing, and engineering design with the limited flight test verification.

Dr. COOPER. Mac, before you leave the F-16, could you put the cost line back on the F-16? It was about three slides back.

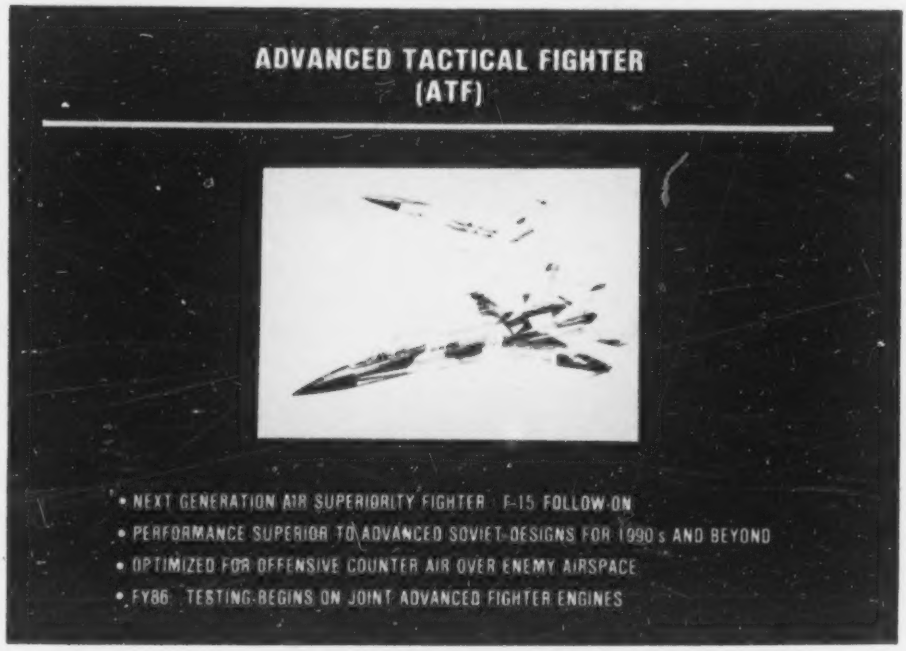
I wanted to point out, Senator, where we are on the multiyear buy. This committee has encouraged us to continue. As you know, we have just completed the initial 4 years of multiyear. What we have done, Senator, is if you look at our production rates, our projected production rates over the next 4 years for F-16's, we are proposing 180 this year, 180 next year, and then in the following 2 years, 216.

We have signed up to is a core multiyear program for 180. We feel relatively certain that we can support 180. The 216 is somewhat judgmental at this point, whether or not we will get that high, but we think we can at least get a very large percentage of the benefits of multiyear by coring 180.

So we have committed to a multiyear program for the next 4 years of 180, with the flexibility to add on an annual basis increments of up to 36 a year.

That is in essence what we are locked into right now.

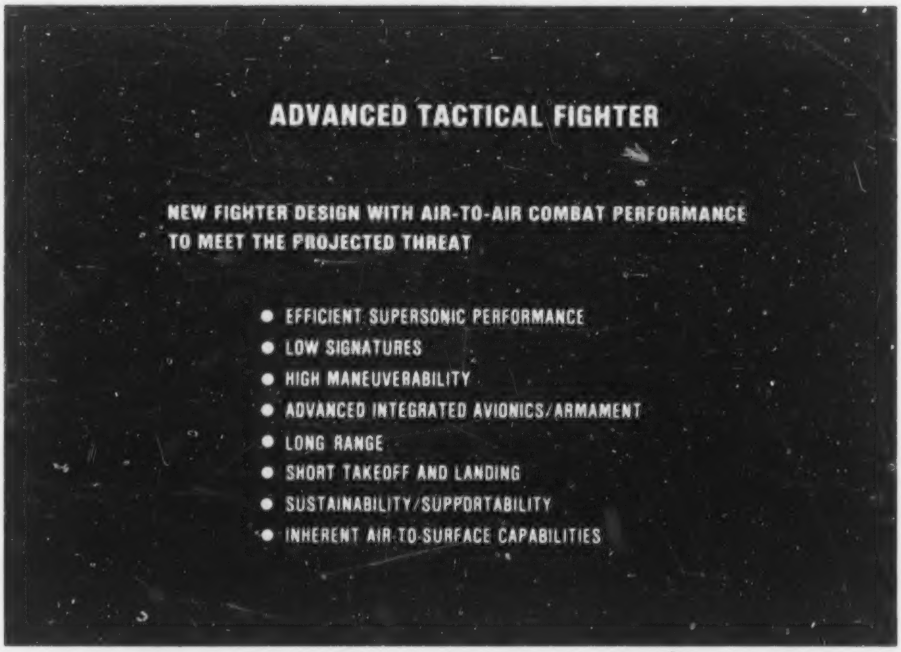
General **Williams**. The savings again because of that, Senator, are $313 million for the 1986 to 1989 procurement.



ADVANCED TACTICAL FIGHTER
(ATF)

- NEXT GENERATION AIR SUPERIORITY FIGHTER F-15 FOLLOW-ON
- PERFORMANCE SUPERIOR TO ADVANCED SOVIET DESIGNS FOR 1990's AND BEYOND
- OPTIMIZED FOR OFFENSIVE COUNTER AIR OVER ENEMY AIRSPACE
- FY86 TESTING BEGINS ON JOINT ADVANCED FIGHTER ENGINES

Now, I would like to speak for just a couple of minutes about the advanced tactical fighter that we think we need to look to for capability to meet the threat in the mid-1990's. The Soviets are moving along with capabilities in terms of quality to meet our F-15/F-16 fighters. They also are producing in large numbers, as you well know. Because of that, in order to be able to offset their numerical superiority and to be able to meet the threat posed by the Soviet fighters in the mid-1990's——



ADVANCED TACTICAL FIGHTER

NEW FIGHTER DESIGN WITH AIR-TO-AIR COMBAT PERFORMANCE TO MEET THE PROJECTED THREAT

- EFFICIENT SUPERSONIC PERFORMANCE
- LOW SIGNATURES
- HIGH MANEUVERABILITY
- ADVANCED INTEGRATED AVIONICS/ARMAMENT
- LONG RANGE
- SHORT TAKEOFF AND LANDING
- SUSTAINABILITY/SUPPORTABILITY
- INHERENT AIR-TO-SURFACE CAPABILITIES

We need to look to the aircraft that we think will help us do that. The advanced tactical fighter is our proposal to do that, with the following performance characteristic, and I will talk about each of those just briefly.

We think we need to be able to carry the fight to the enemy on his side of the battle line, and we need to be able to sustain high supersonic or moderate supersonic performance while in a maneuvering environment. We think that is crucial to our ability to be able to outperform him and survive and carry the fight to him on his side of the battle line. We also think that we need to take advantage of advanced technologies across the board in terms of low signatures, low observables. We will be looking at those technologies not only in the low-RCS but others as to how we might optimize them without compromising our ability to maneuver and meet our overall performance requirements.

We will look to such advanced technologies for our avionics system for operability and reliability enhancements, in terms of the very high speed integrated circuitry that we think will be coming on line at that time, and we should incorporate that and integrate it into our systems to realize the benefits from that. We will give it increased range, about [deleted] nautical miles, we believe, depending on the mission itself, and we will have short takeoff and landing capability to let it remove some of the tether to some of the longer bases.

It will have a [deleted] take-off capability, and will also be able to land within [deleted] and we are looking for thrust reversers to help us have that performance regime.

As I mentioned earlier, we are looking to improve the sustainability and supportability. We plan also to have inherent air-to-surface capabilities, but we don't plan to incorporate that in its mission early on. We will do that in perhaps some ways as we did the F-15, and in the later years of the operation of the aircraft we are going to be able to look at that capability.

Senator GLENN. Could I ask two questions? One, you put a dollar sign on there as another red dot at the bottom there, how much it is going to cost. That would be the biggest factor there. And also, as we develop longer range standoff weapons, do you still feel this is necessary to go this route, what obviously is going to be very expensive, or can we begin to depend more on longer range weaponry?

General WILLIAMS. Sir, we are looking at all of that very carefully, and we are very sensitive to affordability. In fact, we are looking to a 50,000-pound airplane, and we looked at, to constrain the cost of that, with one measure, and that is to limit the gross weight. We do look to air-to-air capabilities with AMRAAM in it. Of course, that will give us a greater standoff in air-to-air, but we still feel that we must have the capability to prevail on the enemy's side to overcome his look-down/shoot-down capabilities that will threaten our penetrating aircraft as they go to strike the target.

So we think we are—listening to what you just said, we think we are including that in our overall approach to the design of the airplane, and we feel responsible and accountable to address those issues as we get more specific.

Senator GLENN. What weapon systems are you talking about for those, or are you thinking about?

General WILLIAMS. The AMRAAM would be our primary weapon system in the air-to-air role, and it will be an air superiority fighter.

Senator GLENN. AMRAAM would be the weapon for this then?

General RUSS. It will have AMRAAM, it will have an infrared missile of the AIM-9 type, and we are talking about standoff ranges, 35 miles on a front quarter.

We also have in the AMRAAM program an effort to look at what we call P3I, or product improved versions of the AMRAAM, and in that regime we would possibly include a ducted rocket motor which would then boost the range out to [deleted]. So we are looking at longer and longer standoffs. But our entire effort in the air-to-air fighter arena plans on a spectrum of weapons that allows us to shoot close-in, midrange, and long range, so that we can fight the battle throughout the area.

Senator GLENN. Will it have guns?

General RUSS. Yes, guns, then a short-range infrared missile, then a longer range radar missile. And we are also looking at antiradiation missiles.

Senator GLENN. Do you have a figure on development cost of what you are outlining for this right now, or just research costs?

General RUSS. We do not have the total number of dollars we are looking at for the program at this point. We just recently had some briefings from the program officer on the program, and one of the things we have done recently is that we have done an affordability analysis to see whether we could afford this airplane with what we are asking for.

And I think the bottom line of that is we will afford it, in that we will make it affordable. We will not try to goldplate it and will not allow it to get to the point where we can only buy two or three of them and end up with a golden BB.

So right now I do not have a figure for the total R&D.

Senator GLENN. I guess what I am getting at, in the budget figure that the chairman is very concerned about—and we all are here—of some of these cuts here, how much are we putting into it right now this year?

Dr. COOPER. $243 million is the R&D request.

Chairman GOLDWATER. How much?

General RUSS. $243 million, sir.

Dr. COOPER. I would be quick to add, Senator, that the bulk of that funding goes for the advanced engine that General Adams mentioned, the so-called JAFE engine, the joint advanced fighter engine.

General WILLIAMS. I will talk a little more about that.

Dr. COOPER. I think your point, though, Senator, is a good one. We are all concerned about affordability in all of the new systems, and that is something we are going to have to watch very closely.

What General Williams mentioned is that one of the ways you constrain that is in terms of weight, and we have a target in terms of gross weight and what our costs would be.

ADVANCED TACTICAL FIGHTER [ATF]

Senator GLENN. This is a comment more than a question. Much as I am in love with high performance aircraft and have been all my life, somewhere you reach a point here where your performance should go into the vehicle you are firing out there, your weapons system, rather than the carrier. And I do not know whether we have reached that point or not, and I wonder whether we are at that point through the advanced tactical fighter.

I would love to fly one of these things. I am sure every pilot would. But from the standpoint of the country and the cost of developing these things, you begin to wonder whether we are not ahead in designing things like AMRAAM and these other things, where we are getting and doing these things 25 and 30 miles out here.

And I question whether we are going to have much need in the foreseeable future or in combat in the future in getting in and hammering away with machineguns, flying dog-fight type operations. And I think they are going to be a little less and less likely as time goes on.

Should we be putting the performance in the weapons system instead of the carrier? I do not know.

Dr. COOPER. I will make a comment and then, as high as my enthusiasm is for ATF, it nowhere matches that of my sidekick here, so he can talk in great detail.

Senator GLENN. I am with him up to this point.

Dr. COOPER. We have not frozen the design yet, Senator. I think the point that you bring up is a good one: What is the proper match between the weapon and the platform. And again, I will give a little commercial for AMRAAM. That is one of the reasons that you are going to see that AMRAAM is as expensive as it is, because we are trying to put a lot of that capability in the missile.

The way I describe ATF. There are at least four things that we are trying to get out of it. One is we are looking for sustained supersonic flight without using military power. Another key one is affordability, with the great emphasis in the Air Force today on reliability, maintainability, and supportability.

We are also looking for STOL characteristics. The new engine that we are looking at right now will have a two-dimensional nozzle. We are not looking for VSTOL, just STOL, so that we can land and take off on short runways, battle-damaged runways.

A final characteristic we are looking for is a modicum of low observability, and there is a key there, too, as to how much low observability are we talking about, because there are some tradeoffs in terms of performance and low observability.

So those are four key things that we are looking at. We have had some concepts that the contractors have been working on and we are looking here in the not too distant future to go into what we call a demonstration validation phase. We have not launched that phase yet, but that will be a competitive phase where we are going to try to get as many contractors as we can to go head-on, to do some paper studies, and to look at these sorts of tradeoffs that we have just discussed.

I think we have to keep affordability high in our mind. Also, the mix between the weapon and the platform itself. Those are the sorts of things that we propose to do here in the near-term before we freeze a design and pick a contractor and head down that road.

Bob may care to add a little bit more.

General Russ. I might just say that we are very sensitive to the point you brought up, about the mix of weapons and airframe and how we would fight the airplane vis-a-vis the threat. As you know, when we look at the threat we see the Soviets with those two new airplanes that he just discussed, and we see them with another two or three by the 1995 timeframe.

We also see them with [deleted]. And so we are trying to design and develop a system that is a major improvement over our F-15, which will allow us to gain and maintain air superiority, and not just a modicum of improvement over something like the F-15.

We are asking for something significant. If we do not get that something significant for a reasonable cost, then we do not believe that it will fit within our budget. We are going to have to go back and look at it again, and that is part of the reason why we are agonizing over it at the Pentagon at this point in time, trying to make all of those things come together so that we can come over here and give you a reasonable profile that buys a reasonable number of airplanes at a reasonable price.

And believe me, Senator, we are very, very strongly behind this program, but we do not want to get going too fast until we are able to say that we really know what we want and what we need.

Dr. Cooper. I think one other point that we should make as well, is that the Air Force, for the last 5 or 6 years in one way or another has been attempting to get started on an advanced tactical fighter.

There was something—Senator Goldwater, you will probably recall this—about 5 years ago called the enhanced tactical fighter, and the Congress was reluctant to support a start, I personally think properly so because there was additional capability to be gleaned out of the F-16 and the F-15. And if you go back and look at the road map that General Adams discussed a little bit earlier, you will see that we are moving to an F-16C, which will be a radar missile capable aircraft, among other things, and perhaps in our future even an F-16F. Those programs are now funded in our budget.

Likewise, we are modifying the F-15 into an F-15E variant, plus making improvements to the basic F-15. So I think we have just about gleaned as much growth capability as we can out of the current generation of aircraft.

And if you look at when we are proposing to IOC the ATF, we are talking about 1995, a decade from now. If the program runs true to course, we will be lucky if we can keep it on that schedule. That is a very optimistic schedule. But at some point in time, I think the Air Force needs to commit to the next generation aircraft, and it appears to me that we are just about at that point in time, given the lead times that it takes to actually put rubber on the ramp.

If we are able to keep on our program schedule, we are talking midnineties before this thing will come into our inventory, some 20 to 25 years since we fielded the last new aircraft.

Chairman **Goldwater**. Could I interject at that point. You are talking about the advanced tactical fighter and what we are looking at up there is the airframe for the F-15. What about the forward-swept canard that Grumman has been testing? Has that shown any possibilities?

Dr. **Cooper**. I will let General Russ comment on that. He and I both went to the rollout of that about 5 months ago, Senator, and since it has had several test flights. In fact, it has had three test flights now and there are some promising technologies to include the forward-swept wing.

Also, the flight control systems that they are looking at are interesting. It is a technology demonstrator, as you well know.

Chairman **Goldwater**. You are talking advanced tactical equipment and that certainly is advanced. This up here is not.

General **Williams**. This is just an artist's concept.

Chairman **Goldwater**. I understand. But do not talk to me about advanced and show me something that is 10 years old.

Dr. **Cooper**. It almost looks like an F-18, does it not?

General **Williams**. The next time you see this, Senator, it will really be advanced.

Chairman **Goldwater**. I am talking about an advanced fighter. I am just as interested in it as you are. I am just wondering if you have any information on the Grumman proposal. Is it working or is it going to work? Is it worthwhile following?

And you do not have any money in this budget for that purpose, I do not believe?

Dr. **Cooper**. No, we do not. But we monitor that and we are participating in the program in terms of testing. I will let General Russ comment a little more fully.

General Russ. Sir, that aircraft has several different technologies in it, all of which are very interesting, and we are very interested in possible application in an ATF. The forward-swept wing is the one that draws the most interest because of the visible nature when you initially look at it, but that forward-swept wing has been made possible by the advent of advanced composites, which have allowed us now when we sit down to design an airplane—the old designers would sit down and they had to give a swept wing. That is the only way they could get the speed.

Now the designer has a clean sheet of paper. He can do a forward-swept wing if he wants, because we can build in the rigidity in the wings which we were not able to do before without undue penalty for weight. So that is one point.

But I think more important is the flight control system and the way they maneuver that airplane. As you know, it has canards on the front part of it. It has a flapper sort of thing that moves 40 times per second. The airplane is basically unstable, but because of the technologies we have today in fly by wire flight controls and digital flight controls, we are able to fly that airplane to the maximum edge of its envelope.

So we think it is very exciting and we are very interested in it. Whether an ATF will look like that or what parts of the technologies that are being proven, will be used, I really do not know yet. It is a little too early to tell. But we follow that quite closely, and we are very encouraged by what they are doing.

Chairman Goldwater. I think Rockwell had an advanced fighter a few years ago. Did that not have a forward-swept wing concept?

General Russ. I do not recall the specific one, sir. But the forward-swept wing concept was an old concept. As you know, in World War II there were people who said you could have a forward-swept wing, but you paid such a major penalty for it because of the warping of the ends of the wings. The only way you could prevent that warping was to put almost steel-like bars out there to prevent it.

We could not get the strength, and when you put all that weight in it, then the performance went to heck. So they gave up on it until we came up with composites, and now we can put a lightweight structure out there that can withstand that bending motion that the forward tip has to withstand.

So I am quite excited about this. Basically, what the forward-swept wing gives you is better transonic speed, and it allows you to fly a little slower. As an example, I would think that the Navy would be very interested in it also, because it will allow you to come aboard carriers at a slower speed.

So there are certain regimes where you pay a penalty with that forward-swept wing, and one of the regimes is in the high-speed regime. You do not quite have the capability that you would with an aft-swept wing. So depending upon what your design parameters are it will depend upon how much you use the forward-swept wing.

Chairman Goldwater. We probably got off the subject and should not have. But the forward-swept wing, you say it is nothing new, they have been making them commercially in Germany for some years. But there is a lot of instability, depending upon what you make it out of.

I wish you would keep this committee posted on that, and when you find out there is going to be a flight at Edwards I would like to go out and take a look at it.

General **Russ**. We would be more than happy to, sir.

Chairman **Goldwater**. In fact, I would not mind flying it.

Senator **Glenn**. One other thing and a comment on that, and I know we do not want to prolong this too long. But you are absolutely 100 percent dependent on your computers on that thing, the first airplane I know where you do not have computers just to help out.

If your computers ever go out, you just disintegrate it, basically that is what happens, because the stability is all negative on that thing. And so what you are going to have to think about is what the Soviets can do in the way of microwave projection and things like this. Any extraneous impulses into your control system on that thing and you could just destroy the airplane like that. It is that critical.

So I think when you are thinking about that kind of design, you had better think about the electrical environment that you are operating this thing in, or it will just destroy itself. Another thing, too, not to criticize this design too far here, but from what I know about the low observable——

Dr. **Cooper**. We have another picture of this. This is our Stealth version, sir.

Senator **Glenn**. From the Stealth technology that I know a little bit about, but I am no expert on, it does not fit the bill.

ELECTRO MAGNETIC INTERFERENCE PROGRAM

General **Russ**. Senator, let me comment on the electro magnetic interference problem that you brought up. In essence, the F-16 is in that category today. It is a fly-by-wire flight control system. We know how to harden it. We know how to put redundancy in it. We have triple and quadruple redundancy in the flight control systems. And we have taken, as an example, the F-16 through lightning tests and through EMP hardening tests, and we found that the designs we have put in there are very good.

So it will withstand all of that. However, we have noticed that very high-powered transmitters, such as the one you find in Europe—there is one down in the southern part of Germany. If you fly very close to it, you get kind of like an odd warning light that comes on, and there are certain levels that you have to be careful of.

We are going to make some small modifications. The Germans also have the similar sort of flight control system in their Tornado and, as you might have read, they crashed one not too long ago. And one of the propositions is that it crashed because of the interference that they received from one of these towers.

And so we are very sensitive to that, but we believe in the F-16 we have already accounted for that. But it is important on these new airplanes, too.

Senator **Glenn**. But I think you are at a whole different level of magnitude here, and I know the chairman does not want to continue this discussion, but a fly-by-wire system is a very positive system. You have got positive control movements out there that result from certain electrical signals sent out. It is quite a different thing where your whole airplane's stability is built around the computer sensing of this thing, which is an order of delicacy, if you will—if you want to put it in that term, it is an order of delicacy of control that is a magnitude way, way beyond anything the F-16 has, as I understand the F-16 system, and I am not an expert in that system.

But you are talking about computer techniques in the forward-swept wing that are necessary to keep that thing from going off the needle on which it is balanced all the time, and it is that kind of sensitivity. And if you get some extraneous electrical signals in that thing, I would not want to be aboard, not with the current technology.

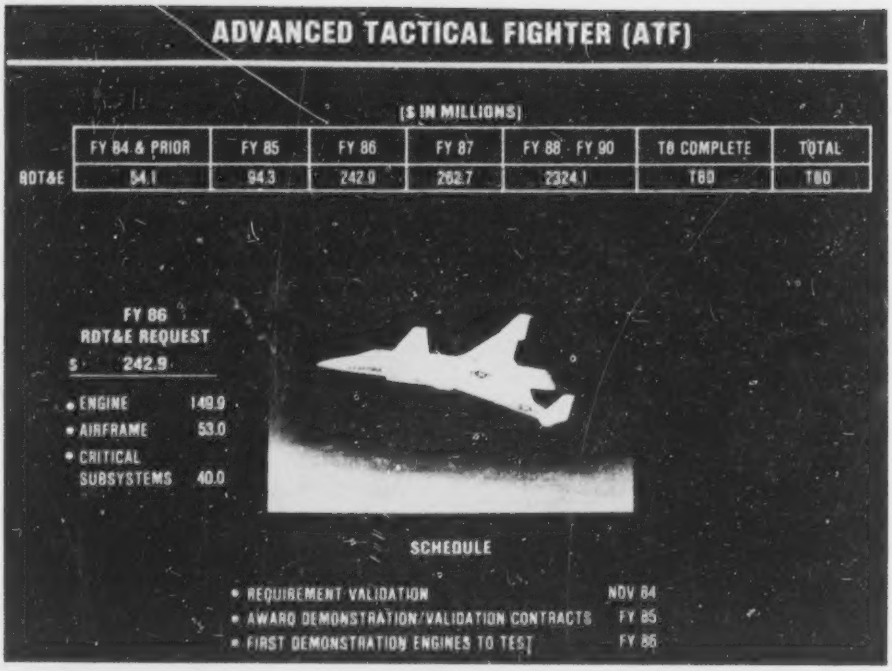
Now, maybe you can shield all of that and make it perfect so that it does not have that kind of interference. But it is an order of control magnitude of difficulty far, far, far beyond anything we see in a straight fly-by-wire system like the F-16 has.

Is that correct or not?

General RUSS. Yes, sir, that is right. What I am trying to say is the techniques we use in the F-16 fly-by-wire, which has interference problems, too, are the same sorts of things we would use on this airplane. We know how to do that. It is a matter of doing it and testing it to make sure, but it is an area where you can be very vulnerable unless you do that, because it would be easy to throw the airplane out of control and that would be disastrous.

Chairman GOLDWATER. I remember the first F-18's had a computer recovery for stall, so that is nothing new to us. But in magnitude it is.

Why do you not continue, General.



ADVANCED TACTICAL FIGHTER (ATF)

($ IN MILLIONS)

	FY 84 & PRIOR	FY 85	FY 86	FY 87	FY 88 - FY 90	TO COMPLETE	TOTAL
RDT&E	54.1	94.3	242.9	262.7	2324.1	TBD	TBD

FY 86
RDT&E REQUEST
$ 242.9

• ENGINE	149.9
• AIRFRAME	53.0
• CRITICAL SUBSYSTEMS	40.0

SCHEDULE

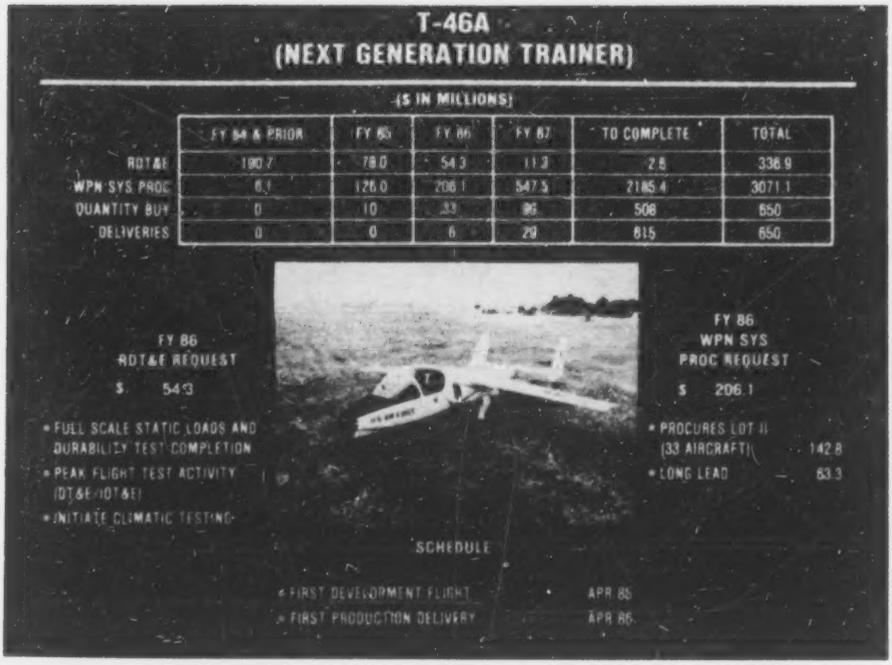
• REQUIREMENT VALIDATION	NOV 84
• AWARD DEMONSTRATION/VALIDATION CONTRACTS	FY 85
• FIRST DEMONSTRATION ENGINES TO TEST	FY 86

General WILLIAMS. Senator Goldwater, if you would look at this more futuristic view here of the aircraft and direct our attention here to the RDT&E request for this year of $242 million, I think it is important to realize the advanced tactical fighter program is divided into three main areas.

One is the engine, the joint advanced fighter engine that I will talk more about in a few minutes. The other is the airframe, which is what we have been talking about just recently here. And the third part, though very important to an appreciation of what the program offers, is critical subsystems, and we have touched on that earlier about integration of more advanced technologies, such as computers, with the faster circuits and the capability to bring into play night vision capabilities, advanced delivery systems, and the state of the art there, to stand off where necessary and still be close enough to fight close in when that becomes necessary also.

But the three main areas here are important to an appreciation of the advanced tactical fighter program. We do have these milestones shown. The first demonstration for the engine will be in 1986. I will talk about the engine separately in just a minute.

I would like to move now to a trainer that I believe you are familiar with, Senator, that now is being made by Fairchild. It is the T-46. We plan to buy a total of 650 of these.



T-46A
(NEXT GENERATION TRAINER)

($ IN MILLIONS)

	FY 84 & PRIOR	FY 85	FY 86	FY 87	TO COMPLETE	TOTAL
RDT&E	190.7	78.0	54.3	11.3	2.6	336.9
WPN SYS PROC	6.1	126.0	206.1	547.5	2185.4	3071.1
QUANTITY BUY	0	10	33	99	508	650
DELIVERIES	0	0	6	29	615	650

FY 86
RDT&E REQUEST
$ 54.3

- FULL SCALE STATIC LOADS AND DURABILITY TEST COMPLETION
- PEAK FLIGHT TEST ACTIVITY (DT&E/IOT&E)
- INITIATE CLIMATIC TESTING

FY 86
WPN SYS
PROC REQUEST
$ 206.1

- PROCURES LOT II (33 AIRCRAFT) 142.8
- LONG LEAD 63.3

SCHEDULE

- FIRST DEVELOPMENT FLIGHT APR 85
- FIRST PRODUCTION DELIVERY APR 86

Chairman **Goldwater**. What is the going price for that now?

General **Williams**. Well, we are going to buy——

General **Russ**. It is about $2.5 million, sir.

Chairman **Goldwater**. $2.5 million each?

General **Russ**. Yes, sir.

Chairman **Goldwater**. What is the speed, 1.7?

General **Williams**. I do not have the exact figures of maximum speed.

General **Russ**. The $2.5 million is base year dollars, sir. In the year dollars we are talking about a flyaway cost of about $4.2 million.

General **Williams**. 400 knots, sir. It will land in about 5,000 feet and climb at about 456 feet per minute from zero altitude. That has a ceiling of about 46,000 feet.

Chairman **Goldwater**. And that is now in production, is it not?

Dr. **Cooper**. We have approved production going up for lot one now, and we had the roll out of the first T-46 in early February, I believe it was.

General **Williams**. Our first production and delivery, sir, to the field will be in April 1986.

Chairman **Goldwater**. So you do not have them flying now?

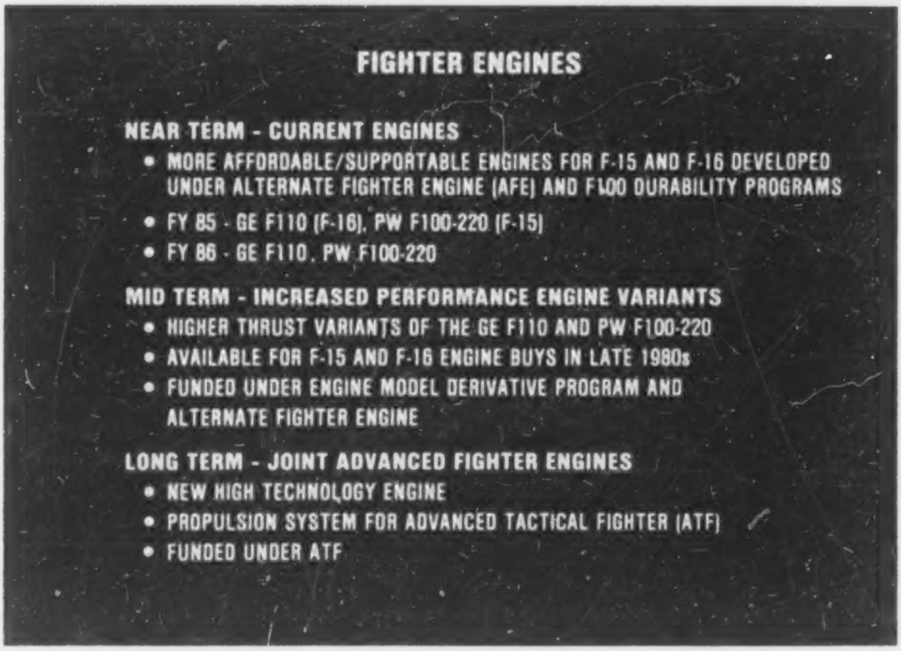
Dr. **Cooper**. No.

General **Russ**. I think the one that they rolled out a month or so ago will be flying in the April timeframe, sir, next month. Six to eight weeks, it will be flying.

Dr. **Cooper**. It was not in flyable status. It was just the first production T-46. It had yet to complete its qualification, Senator.

Chairman **Goldwater**. What engine are you using in that?

Dr. **Cooper**. We are using the Garrett engine.



FIGHTER ENGINES

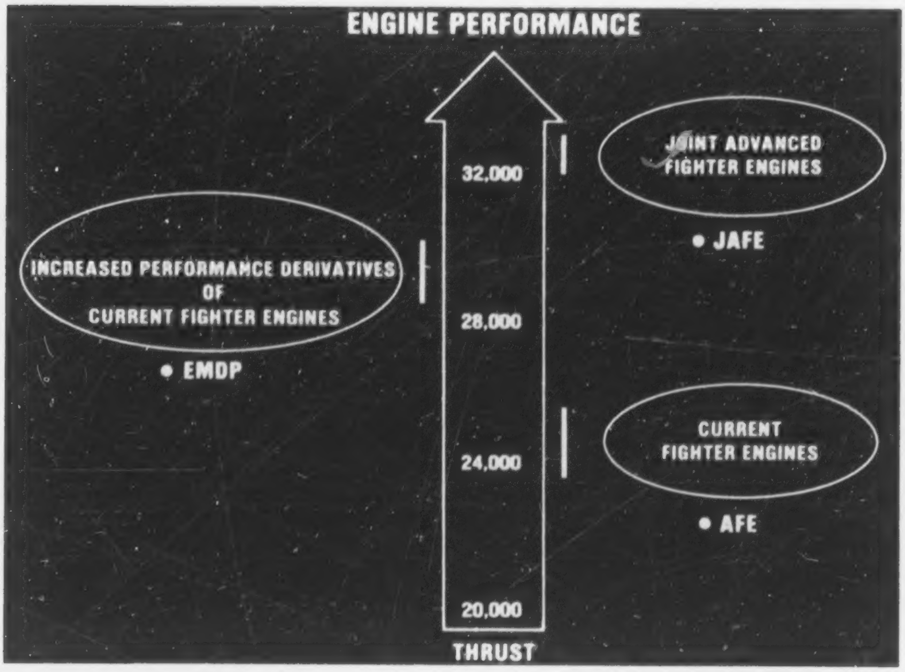
NEAR TERM - CURRENT ENGINES
- MORE AFFORDABLE/SUPPORTABLE ENGINES FOR F-15 AND F-16 DEVELOPED UNDER ALTERNATE FIGHTER ENGINE (AFE) AND F100 DURABILITY PROGRAMS
- FY 85 - GE F110 (F-16), PW F100-220 (F-15)
- FY 86 - GE F110, PW F100-220

MID TERM - INCREASED PERFORMANCE ENGINE VARIANTS
- HIGHER THRUST VARIANTS OF THE GE F110 AND PW F100-220
- AVAILABLE FOR F-15 AND F-16 ENGINE BUYS IN LATE 1980s
- FUNDED UNDER ENGINE MODEL DERIVATIVE PROGRAM AND ALTERNATE FIGHTER ENGINE

LONG TERM - JOINT ADVANCED FIGHTER ENGINES
- NEW HIGH TECHNOLOGY ENGINE
- PROPULSION SYSTEM FOR ADVANCED TACTICAL FIGHTER (ATF)
- FUNDED UNDER ATF

General WILLIAMS. I would like to move now to the subject we have mentioned a couple of times, and that is engines. As we look to our engine technology, sir, you will appreciate the value and importance of having an ongoing program to ensure that you are moving ahead with your engines and not wait until you build an airplane and then find an engine for it.

Our overall program can be divided into three areas, based primarily on time: In the near term, the improvements to our current engines to get the most from them, to include performance and reliability improvements; increased performance engines for the midterm, and I would say something like the late eighties, early nineties; and the long term, which is represented by the joint advanced fighter engine in this case, aligned up to meet our advanced tactical fighters in the mid-nineties, 1995, IOC.


ENGINE PERFORMANCE
JOINT ADVANCED FIGHTER ENGINES
32,000
• JAFE
INCREASED PERFORMANCE DERIVATIVES OF CURRENT FIGHTER ENGINES
28,000
• EMDP
CURRENT FIGHTER ENGINES
24,000
• AFE
20,000
THRUST

Right now we are in the 24, slightly above 24,000-pound thrust capability, as we look to improve our engines, our current engines. And then as we move to an evolutionary approach to improve upon our current engines, we look to moving out around the 28,000 area.

But for the joint advanced fighter engine, if that is what you are specifically interested in, we are looking at the 32,000-pound class. We are not sure we need that much, but we want to have the technology to support that if we do need a 32,000-pound class engine.

As we mentioned earlier, we feel we need to have the capability to sustain supersonic flight at military power. The engine shown here with the advanced tactical fighter airframe will do that for us, and it has been a while since we could sustain supersonic flight with the military power setting.

Chairman GOLDWATER. Have not the Soviets an engine quite a bit above that?

General WILLIAMS. I do not know the answer to that question, Senator.

Dr. COOPER. Senator, I may be mistaken. In terms of raw thrust they may, but in terms of thrust to weight, which is a measure of the merit of the engine, I do not believe they are in the same category that we are.

Chairman GOLDWATER. If you had that information and it is not classified, I think that would be a good part of the record.

Dr. COOPER. We will supply that.

[The information follows:]

JOINT ADVANCED FIGHTER ENGINE/THRUST CAPABILITY

The Soviets have possessed a fighter engine in the [deleted] pound thrust category (sea level static, uninstalled thrust) probably since [deleted] with their Mig-23/Flogger series aircraft. Soviet Flogger interceptors operate with a [deleted] power plant, and comprise approximately 60 percent of the current Soviet interceptor force. The newer Soviet Foxhound and Flanker aircraft are assessed to operate with [deleted] category. The Soviets are not assessed to possess a fighter engine in the 32,000 pound thrust category.

General **Williams**. The thrust to weight ratio here, Senator, is 9 and these are down around 7. So that is a considerable improvement for us. In addition, we have reduced the number of moving parts. They will be operating at higher temperatures, but that is the price you pay. But we think with some of the advanced metals that can be handled.

But the reliability and maintainability of these engines, we are very sensitive to that, and this move in this direction not only gives us increased performance, but we are demanding increased reliability and operability.

Senator **Bingaman**. Mr. Chairman, let me ask about this joint advanced fighter engine. I have a memo here from the inspector general saying that it is no longer joint.

Dr. **Cooper**. That is correct, Senator. It is joint in name only at this point. When the Navy decided to back away from what was essentially their ATF and go to an ATA—and they will have to brief you on that—they no longer had a requirement for an engine of this capability. So essentially we are going it alone at this point.

I suspect at some point in the future, if the Air Force develops it, the Navy may have an interest in it. But right now they are not participating in a robust way.

Senator **Bingaman**. So basically, as far as you know there is no commonality anticipated at all between the advanced tactical fighter that you are talking about and what the Navy is now thinking of as an advanced——

ADVANCED TACTICAL AIRCRAFT [ATA]

Dr. **Cooper**. Advanced tactical aircraft, ATA. Mr. Paisley, who is my counterpart in the Navy, he and I signed a document back in November or December agreeing to get together to make sure, to the extent that we could have commonality between the two programs, the ATA and the ATF, we would.

We would have to go into a higher level of classification to brief you on the details of our program and their program. What we have concluded is that they are essentially different aircraft and they are for different missions. We think there may be an area of commonality in the subsystems, perhaps in the avionics. We have a team together to look into this—General Williams is representing the Air Force, and his Navy counterpart are looking at that right now.

Mr. Chairman, might I make a comment on the great engine war? I cannot let the opportunity pass, because it was such a hot item for 5 or 6 years, that is where we competed the Pratt F-100 engine and the General Electric F-110. As you well remember, last year Secretary Orr made a decision where he put the improved version of the Pratt engine, which was selected out of the great engine war, and put it in the F-15, and to take the F-110 and put it in the F-16.

Quite frankly, that was a devastating blow to Pratt & Whitney last year, because the F-16 represents the majority of our long-term business in the Air Force. By taking them out of the F-16 it significantly threatened their engine base.

I think the decision that was made this year is a very significant one in two respects. We have now had our second increment of buy that we are signing up to, and the Secretary has decided to continue putting the Pratt engine in the F-15, but to split the F-16. He gave a wing of F-16's to Pratt & Whitney and a couple of wings to General Electric.

This is very significant from Pratt's point of view, in that they are back into the F-16 business. It is not only significant from the point of view of the domestic buy, but also from the worldwide buy, that they are back in the F-16. The other thing that I think was significant about the Secretary's decision was his decision to open the engine bay in the F-15 in the future so that it can accept an F-110, a General Electric engine, and as a result of that we think downstream over the next several years we will have vigorous competition both for our F-15 business and our F-16 business, because the engine bays in both the F-15 and the F-16 will be configured such that they can take either engine.

So we think we have postured ourself in a very, very good position from a competitive point of view. We will be able to keep these two great engine manufacturers going head to head.

The other thing that I would say to you, and I will not beat around the bush, is that I think the Air Force in past years has been less than satisfied with Pratt & Whitney, but I do want to tell you that over the last year we have been extremely pleased by the responsiveness that we have received from both contractors.

As I have said, competition is a wonderful thing, and I think we have postured ourself in the future so we can keep going head to head. That has got to bode nothing but good, I think, for the country and the Air Force.

Chairman GOLDWATER. I agree with you. I think that is a very wise move.

Dr. COOPER. The other point that I would make, Senator, and General Williams has it here on his slide, is that not only are we postured to go head to head with the current version of the F-110 and the F-100—that is, this generation of engine—but we are now, I think, about to come to a decision in the building of the next generation engine. In fact, we would have talked to my boss, the Secretary of the Air Force, this afternoon about it, but unfortunately he is out ill.

But we now have an option to increase the thrust of both the F-110 and the F-100 to get them both up into somewhere around the 29,000- to 30,000-pound category, and that is what you see here. And we can do that in a competitive way, keeping them both going head to head as we up the thrust.

Now, in increasing the thrust, we do not want to back off the durability, because that is what has got us into problems with the old version of the F-100. We probably pushed performance just a little bit beyond the limits and the engine wore out a little bit too soon.

But given the new cooling techniques and the new materials that both improved versions of these engines incorporate, we think that we can maintain the durability and get warranties at the 3,000 to 4,000 TAC cycle level, and at the same time increase the thrust up into the 29,000 to 30,000 pound category.

So the next step is to see if we can glean some more capability out of the engines which we are already producing. Then, apropos to your question, Senator Bingaman, and what General Williams has been discussing, in the long term we want to move into a whole new engine that will be in the 32,000-pound class, which hopefully have high durability, and will incorporate, we think at this point, a two-dimensional nozzle that will give us a short takeoff and landing capability.

This program, at one time, when it was a technology program, Senator, was a joint program. Perhaps Mr. Smith can help me with the name of the old Navy program? That was VTE or VFMX. When they had the VFMX, that was kind of our ATF they were anticipating. That was a supersonic aircraft.

They were anticipating using this engine. Right now the Navy has changed their position, and their ATA is a different type of aircraft. I probably should not say any more, except that they do not envision using this type of an engine. But I would point out, Senator, that after we spent the primary development money on the F-110, and had our great engine war last year, selected it for the F-16. Kind of quietly, off to the side, Secretary Lehman made a decision that he was also going to put the F-110 in the F-14.

So my point to you is, if we develop this engine, I would think that perhaps at some point in the future, if we have it on the shelf, that it might be attractive to the Navy as well.

COMMONALITY OF AVIONICS

Senator BINGAMAN. Mr. Chairman, could I back off of engines for just a minute and go back to commonality of avionics and electronics between all of these various aircraft. To what extent are you aiming for commonality?

We got a statement from the Navy that they have a policy to attain 90-percent commonality in avionics and electronics for the F-14, F-18, A-6, and AV-8B. Do you have a similar policy?

Dr. COOPER. We have an avionics standardization policy in the Air Force where we try to go standard wherever we can on avionics, whether it is INS', FLIR's, jammers, ASPJ, the airborne self-protection jammer or what have you.

I will let General Russ comment a little more fully, but back to the comment I made about the ATF and the ATA, where Mr. Paisley and I have gotten together and formed a group, to look at an area where we think there could be a great deal of commonality, that is in the avionics.

And as you well know, Senator, we spend an awful lot of money in that area. Let me ask General Russ to comment a little more fully.

ICNIA

General RUSS. We are making a major effort in common avionics for some of our aircraft. In fact, we are the ones that are in charge of the program which is called ICNIA, which the Navy has joined us to be able to do that.

I do not share the same enthusiasm as the Navy does for entire standardized systems, and let me explain why. First, if you have a common radar on all of your fighters or a common assortment of avionics in all of your fighters, then you have a common thread. That means the enemy only has to employ one sort of a jammer to jam your radar, so he can jam your entire force.

So in some cases it is worthwhile to have more than one, on different frequencies, different types, and it causes him many problems. But that is not to say that commonality cannot be had in other ways, and in that regard we have a program that we have started which is called ICNIA, and that is an abbreviation, I-C-N-I-A.

And in essence what that program does is, it has a standardized base in which we take separate types of wave forms. As an example, you take a radio, you take a GPS, you take an IFF, you take a tachometer, or whatever you have in the various types of avionics that is in the airplane. And you run those all through one sort of black box. That black box would be the computer.

It will distribute the signals, and in essence you are able to do that because we now have the very high speed integrated circuitry coming in. We are now producing circuits at the 1.25 micron level, so we are able to build redundancy of circuits in that sort of a box.

As an example, each of your individual boxes today, like a TACAN set, has its own processor, has its own little computer, its own software. Your IFF system has its own. You do away with all of that and you centralize it in one, and then what happens is if you have a failure mode, because you have built-in redundant circuits it just automatically steps to the next card.

And when you land, the crew chief looks at the box and it has three red lights on it, so he pulls out the three red cards and he puts three new cards in it.

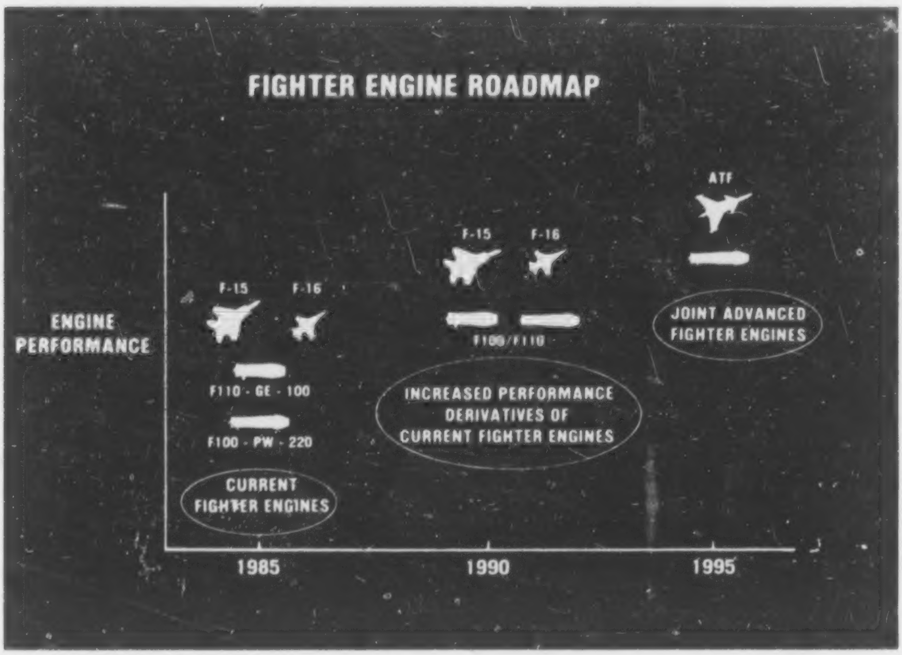
By making the system much smaller, you also are able to make them much more reliable, and the reason for that is because it does not take as much cooling and you have more space for cooling. So it is a great new advancement that we are going to be able to use on all of our new avionics, and that is the program that the Air Force and Navy are working together on to do these sorts of things that Secretary Lehman mentioned.

Dr. Cooper. We have one other one as well. The airborne self-protection jammer is another joint effort between the Air Force and the Navy. Actually, the Navy started it and we came on board; I guess that was 4 or 5 years ago. We are going to use the ASPJ in the F-16. They propose to use it in the F-18 and F-14, I believe.

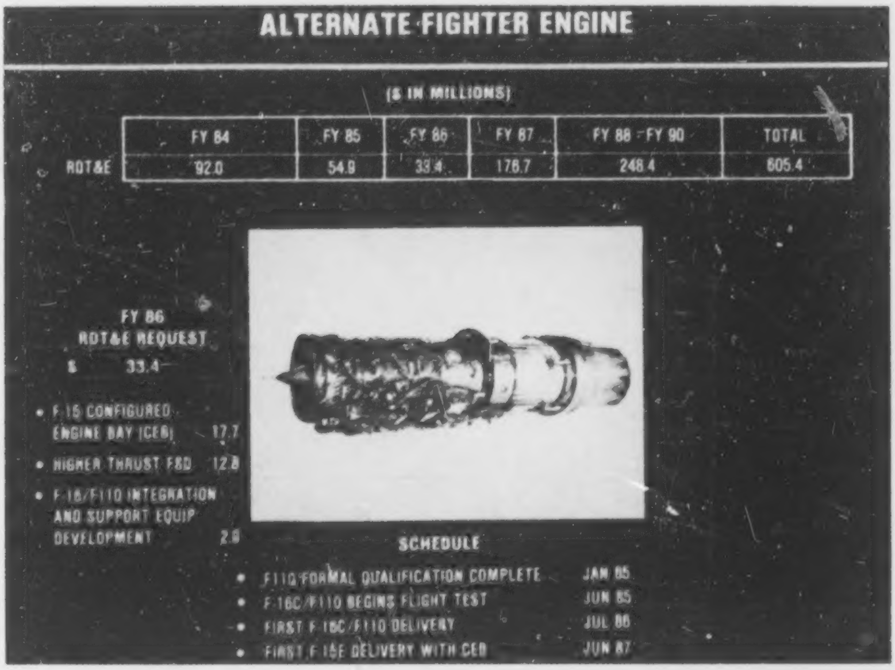
At any rate, it is a joint effort where we are both working toward a common advanced jamming suite.

General Russ. But again, I would like to say one more thing, and that is, I caution against the idea that everything standard is good. One of the reasons we enjoy—or I should say, one of the reasons we wanted to have two different types of engines for our fighter force is because if we had a catastrophic failure in one engine for some reason or another, let us say, all of a sudden a hot section deteriorated and went, we would not ground our entire force.

We would have a backup capability with other engines. And we have that now. We had a single thread there for quite a while, and so we have to be careful that we do not make it easy for the Russians to defeat whatever it is that we can come up with.


FIGHTER ENGINE ROADMAP
ENGINE PERFORMANCE
F-15
F-16
F110 - GE - 100
F100 - PW - 220
CURRENT FIGHTER ENGINES
F-15
F-16
F100/F110
INCREASED PERFORMANCE DERIVATIVES OF CURRENT FIGHTER ENGINES
ATF
JOINT ADVANCED FIGHTER ENGINES
1985
1990
1995

General WILLIAMS. The point I wanted to make, sir, as I think just illustrated by the discussion that we just concluded, is that we do have a road map. We do have a plan for engine technology, and we think it is proven and we think it is right.



ALTERNATE FIGHTER ENGINE

($ IN MILLIONS)

	FY 84	FY 85	FY 86	FY 87	FY 88 - FY 90	TOTAL
RDT&E	92.0	54.9	33.4	176.7	248.4	605.4

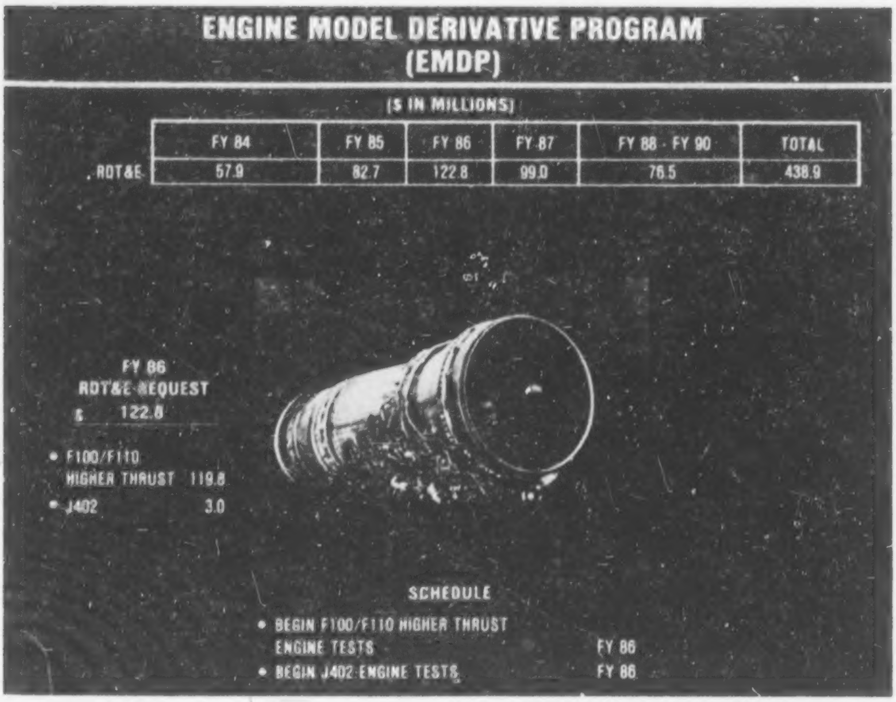
FY 86
RDT&E REQUEST
$ 33.4

• F-15 CONFIGURED ENGINE BAY (CEB)	17.7
• HIGHER THRUST FSD	12.8
• F-16/F110 INTEGRATION AND SUPPORT EQUIP DEVELOPMENT	2.9

SCHEDULE

• F110 FORMAL QUALIFICATION COMPLETE	JAN 85
• F-16C/F110 BEGINS FLIGHT TEST	JUN 85
• FIRST F-16C/F110 DELIVERY	JUL 86
• FIRST F-15E DELIVERY WITH CEB	JUN 87

Very quickly and in specifics for those engine programs we have mentioned, the alternate fighter engine, we are asking for $33 million this year to do this. Dr. Cooper has already talked about the common engine bay that both engines can go in, and we are looking for the delivery with the common engine bay, for example, in June 1987.



ENGINE MODEL DERIVATIVE PROGRAM
(EMDP)

($ IN MILLIONS)

	FY 84	FY 85	FY 86	FY 87	FY 88 - FY 90	TOTAL
RDT&E	57.9	82.7	122.8	99.0	76.5	438.9

FY 86
RDT&E REQUEST
$ 122.8

- F100/F110 HIGHER THRUST 119.8
- J402 3.0

SCHEDULE

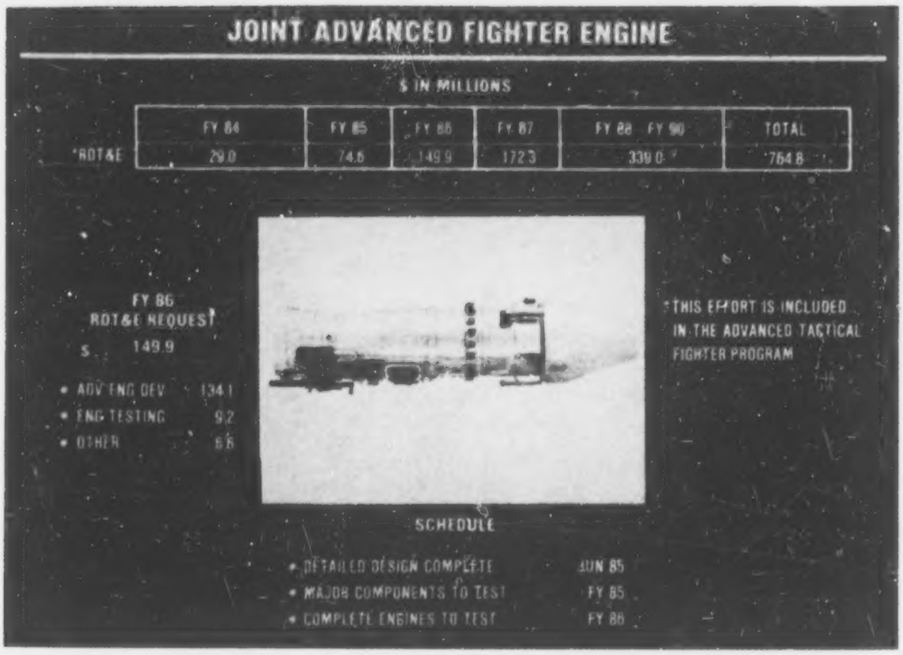
- BEGIN F100/F110 HIGHER THRUST ENGINE TESTS FY 86
- BEGIN J402 ENGINE TESTS FY 86

The engine model derivative program is one of those programs designed to capitalize on the goal of say 4,000 tactical cycles, which again Dr. Cooper mentioned earlier. The ability to move up to that is very important in terms of operability and reliability, and it enhances the life of the engine and the amount of support we have to provide. That is thrust delivered in a very clear sense for our forces in the field, and we are very sensitive to that.

This program is designed to do that as we move to higher thrust, looking to move up around the 28,000 thrust category. Thrust to weight goal, of course, though, is considered the most important measure.

Chairman GOLDWATER. Is there a standard bypass?

General WILLIAMS. No, sir, I do not think we could say a standard bypass. There is some interesting innovative thinking, though, in the engine manufacturers as to how to work the bypass ratios, to look to opportunities for improved performance. But that is not—there is not a standard bypass; no, sir.



JOINT ADVANCED FIGHTER ENGINE

$ IN MILLIONS

	FY 84	FY 85	FY 86	FY 87	FY 88 FY 90	TOTAL
*RDT&E	29.0	74.6	149.9	172.3	339.0	764.8

FY 86
RDT&E REQUEST
$ 149.9

- ADV ENG DEV 134.1
- ENG TESTING 9.2
- OTHER 6.6

*THIS EFFORT IS INCLUDED IN THE ADVANCED TACTICAL FIGHTER PROGRAM

SCHEDULE

- DETAILED DESIGN COMPLETE JUN 85
- MAJOR COMPONENTS TO TEST FY 85
- COMPLETE ENGINES TO TEST FY 86

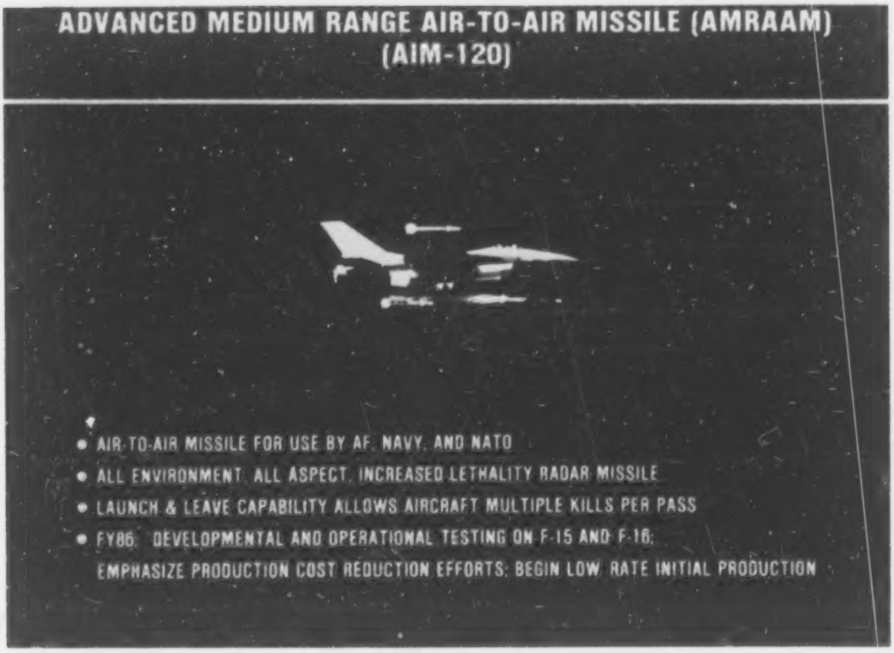
Finally, the joint advanced fighter engine which we have mentioned. This is carried in the ATT line, but it is important enough to mention here again, roughly $150 million in fiscal year 1986. And we are looking to continue testing these engines. I think we discussed this at some length, but we will be proceeding with this program, which is very important to the future of the advanced tactical fighter, but we think a real step forward for all of our aircraft in order to have a high performance engine with fewer moving parts that can move to the 4,000 tactical cycle area and then provide us the performance we need also.

Dr. COOPER. Senator, as you well know, one of the long poles in the tent in the development of new aircraft has always been the engine. And what we are trying to do here is to get off to a running start so we can shake, rattle, and roll, and work out some of the bugs before we actually have to field it, to hopefully avoid the types of problems we had with the F-100 when we initially deployed it in the F-15.

Chairman GOLDWATER. You have the engine waiting for the airplane?

Dr. COOPER. Hopefully. That is the plan.

General WILLIAMS. This will have a thrust-to-weight ratio of a little over nine, Senator, and that is a big step forward.



ADVANCED MEDIUM RANGE AIR-TO-AIR MISSILE (AMRAAM) (AIM-120)

- AIR-TO-AIR MISSILE FOR USE BY AF, NAVY, AND NATO
- ALL ENVIRONMENT, ALL ASPECT, INCREASED LETHALITY RADAR MISSILE
- LAUNCH & LEAVE CAPABILITY ALLOWS AIRCRAFT MULTIPLE KILLS PER PASS
- FY86: DEVELOPMENTAL AND OPERATIONAL TESTING ON F-15 AND F-16; EMPHASIZE PRODUCTION COST REDUCTION EFFORTS; BEGIN LOW RATE INITIAL PRODUCTION

Now I would like to go into the advanced medium-range air to air missile, the AMRAAM. We think this program, again, is very important to our future. Some comments have already been made about the ability to reach out and hit—strike your enemy before he can hit you, and we think this represents that capability and the necessary requirement for us as we look to the future.

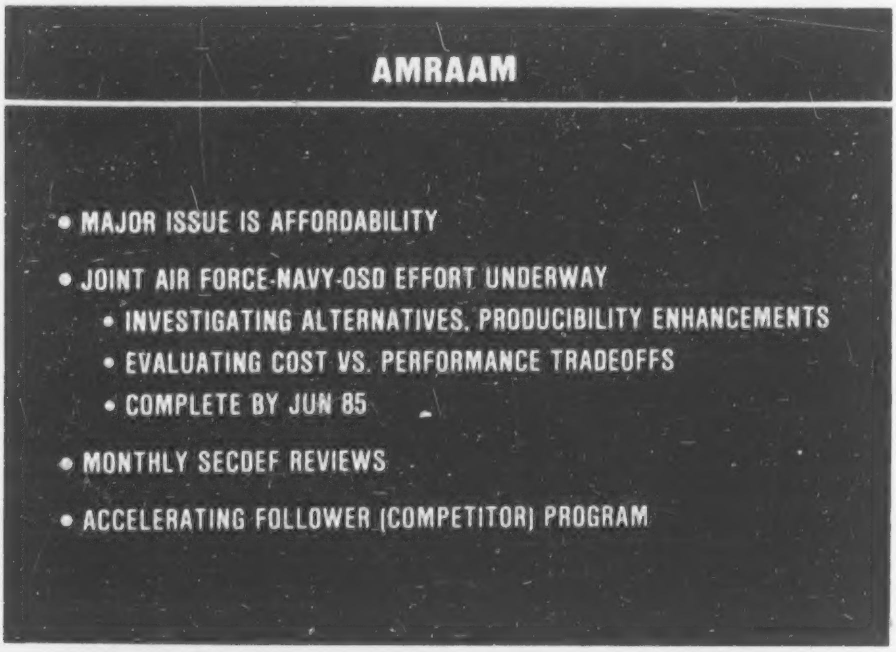
It will be an all-environment, all-aspect radar missile. A launch-and-leave capability again is very important, and it allows us to have multiple kills per pass, so that it can track more than one target.

As you know, Senator, the period of time for most air-to-air combat is a matter of seconds, so the ability to capitalize fully upon our sensors as expressed by the radar, as well as the capability of our munitions to reach out and strike the enemy, is very important.

Chairman GOLDWATER. Well, let me just ask about this AMRAAM. There is no question in anybody's mind that I have heard that it is a very effective and desirable weapon. As you know, the manufacturer is having problems, and I do not have to tell you that when they hand us an ultimatum that we are going to knock $18 billion out of our defense spending the first thrust, whether we like it or not, will come at weapons like Divad, AMRAAM, and others that just have not hacked it.

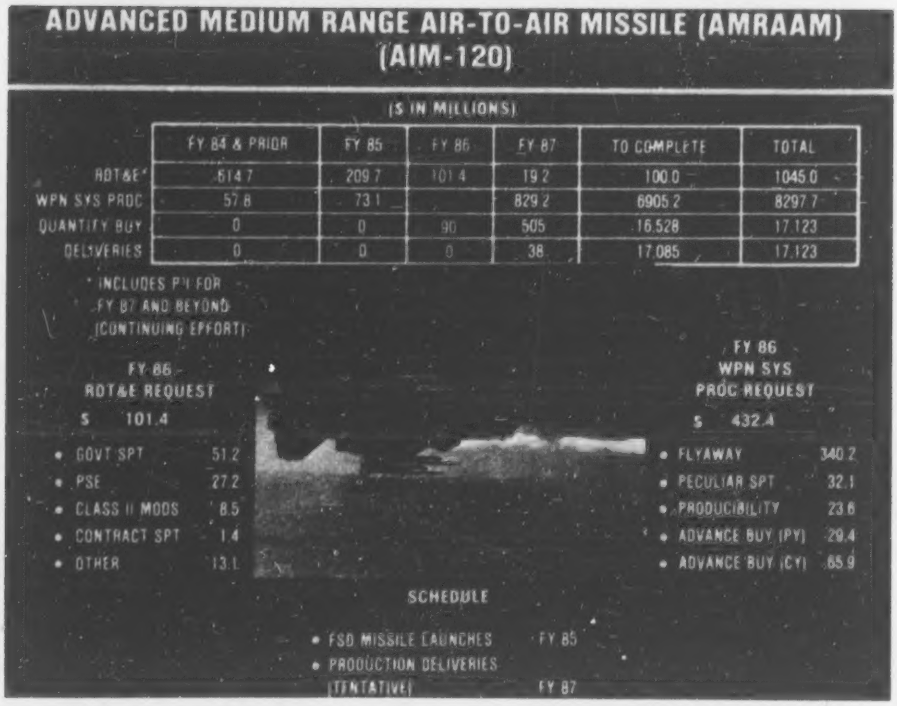
Now, I would like to ask you, has the Air Force given any consideration to procuring an advanced Sparrow for future BVR requirements?

Dr. COOPER. Senator, could I maybe address that in a little more general terms? The answer to that is yes, we are looking at that right now.



AMRAAM

- MAJOR ISSUE IS AFFORDABILITY
- JOINT AIR FORCE-NAVY-OSD EFFORT UNDERWAY
  - INVESTIGATING ALTERNATIVES, PRODUCIBILITY ENHANCEMENTS
  - EVALUATING COST VS. PERFORMANCE TRADEOFFS
  - COMPLETE BY JUN 85
- MONTHLY SECDEF REVIEWS
- ACCELERATING FOLLOWER (COMPETITOR) PROGRAM



ADVANCED MEDIUM RANGE AIR-TO-AIR MISSILE (AMRAAM) (AIM-120)

($ IN MILLIONS)

	FY 84 & PRIOR	FY 85	FY 86	FY 87	TO COMPLETE	TOTAL
RDT&E*	614.7	209.7	101.4	19.2	100.0	1045.0
WPN SYS PROC	57.8	73.1		829.2	6905.2	8297.7
QUANTITY BUY	0	0	90	505	16.528	17.123
DELIVERIES	0	0	0	38	17.085	17.123

* INCLUDES P^3I FOR FY 87 AND BEYOND (CONTINUING EFFORT)

FY 86 RDT&E REQUEST

$ 101.4

GOVT SPT	51.2
PSE	27.2
CLASS II MODS	8.5
CONTRACT SPT	1.4
OTHER	13.1

FY 86 WPN SYS PROC REQUEST

$ 432.4

FLYAWAY	340.2
PECULIAR SPT	32.1
PRODUCIBILITY	23.6
ADVANCE BUY (PY)	29.4
ADVANCE BUY (CY)	65.9

SCHEDULE

FSD MISSILE LAUNCHES	FY 85
PRODUCTION DELIVERIES (TENTATIVE)	FY 87

By the way, I think in the little speech you just gave us on affordability, was also given to us by Secretary Weinberger gave us that same speech back in January when we brought the AMRAAM down to him to review. And I do not think it would bother him if I were to tell you that he was not happy with the cost either.

I think we had convinced ourselves in the Air Force that, even with the cost increase as a result of the slip in the program, that it was affordable. But he has tasked me specifically to put together a committee to do two things, and I have two working groups that are working right now. One working group has been tasked to take a look at the AMRAAM missile itself, to see if it can be simplified in any way with an eye toward getting the cost down. That group is literally tearing that missile apart piece by piece right now to see if there are things that can be done in the way of producibility in order to lower the cost.

That group's work will be done in about a month. I think I can safely say that there will be some things that we can do. How much of an impact on cost and operational capability that is going to have, I am not quite yet sure. We did a similar sort of thing 2 years ago with HARM and we were able to lower the cost of HARM by 23 percent. That is the idea with this group.

The other group has been set up to look for alternatives to AMRAAM in the event that it is deemed that AMRAAM is not affordable. That is headed by an individual that I think you know and I have great respect for, former Air Force Col. Paul Kominski.

I think Paul is as qualified as anybody that I know to look for alternatives. He has a wealth of background. What I have told Paul is that no holds barred; if you can find an alternative to AMRAAM, please bring it forward.

A modified version of Sparrow is one of the things that he is looking at right now. The Navy has been working out of their laboratory on something called a tail-controlled Sparrow. We looked at that a year ago and discounted it, Senator, primarily because of the weight. The Sparrow is in excess of 500 pounds. The AMRAAM missile is roughly 350 pounds, and we need that sort of weight to go on an F-16, the lightweight fighter.

But that option is back in. We are looking at that along with several other things that we might be able to do.

I am not sanguine about what I see for alternatives. Quite frankly, I do not think there is anything out there that we have overlooked that will do the AMRAAM's job. But I guess I have got to tell you, if the judgment is to cancel AMRAAM, there will be an Air Force here next year and we will do something in its place, maybe just put two AIM-7's on F-16's. I think that would be a shame, if we had to walk away from AMRAAM.

TERMINATING THE AMRAAM PROGRAM

Chairman **Goldwater**. Well, I do too. But the question is, you do not think we should terminate the AMRAAM program?

Dr. **Cooper**. Absolutely not. I would not recommend that right at this point. But if I had to make a recommendation to the committee—I think you are in somewhat the same position as Mr. Weinberger right now. I am on the hook to get back with him before we take another step toward production.

Now, what we are doing in the meantime is we are continuing to fund the research and development program. We have Hughes Aircraft on a firm fixed price contract to complete the R&D program for $556.7 million, and we fully intend to enforce that contract.

I might mention to you that Hughes tells us that, if that be the case, they are going to spend $200 million of their own money to do it, because they are about 22 months behind schedule right now. But in the current climate, we intend to enforce the contract.

The net decision that we next need to make would fall in about the June timeframe. That would be a commitment to go into the initial production of AMRAAM. We have not committed to production yet. That initial production lot will be for 90 missiles, 70 of which will go to Hughes and 20 of which will go to Raytheon.

One of the things that we are doing to get a hold on the cost problem is to try to bring on a second source as fast as we possibly can. And as you probably know, we are bringing on Raytheon as a second source to Maverick. They also won the competition for AMRAAM, and we think it is extremely important, given the size of this program and the dollars involved, to have two guys going head to head.

And I will tell you, they are breathing very heavy down Hughes' neck right now, because in some respects the guys that won this competition, Hughes Aircraft, have been put in the spotlight. He has got to develop it. And Raytheon is off right now doing everything they can to improve the producibility of that missile so that they can clean their clock when it comes to a head-to-head competition.

I think that is good because it puts heat on both of them.

Chairman GOLDWATER. I want you to be aware of the major problem that we are faced with in the Congress.

Dr. COOPER. I understand that, Senator.

Chairman GOLDWATER. And the chances of any questionable program getting through this Congress I would not give you 5 cents for. Like the Divad. I am a great believer in the Divad, but it is not proven.

And the AMRAAM is one that I have great faith in. When we get out on that floor, we are going to have everybody in the world shooting at you, and they are going to take the weapons system that we cannot stand up and really defend in a nontechnical way that they will understand.

So if you could keep in mind that we are talking about May and June. So you better tell them to get busy.

Dr. COOPER. We are moving fast, Senator. And I am very well aware of that. I think we are moving about as fast as we can.

Let me make two points, if I can, about AMRAAM for you, though. You put it in the same category as Divad, and since I left the committee staff I have not followed Divad that closely, but the two comments I would make is: First we have had no technical show stoppers with AMRAAM to date; we are simply behind schedule, not because we have become a cropper and run across technical problems. That is not to say that it is not a stressing program. It is a stressing program.

The other thing I would say, if you would allow me on behalf of the Air Force, is that we have not moved precipitously on AMRAAM. We could have made a decision to go into production last year, and we deemed we were not ready to do that, and as a result we have held.

So we have no intentions of going into production until that missile is ready for production, and I want to assure you of that. Until we meet our criteria, even if we get a go-ahead, we are not going to go into production. There is too much at stake here with this particular missile.

Senator **Bingaman**. Let me just followup, Mr. Chairman. You are asking us for $366 million to buy this first lot to go into production of the first 90 missiles. Does it make any sense for us to be marking up to that kind of a figure while you are still working with your working groups and task forces to figure out whether or not it is affordable and whether you are going to recommend to the Secretary of Defense that we even go ahead?

Dr. **Cooper**. Well sir, I would like to say trust me, but I doubt that that would have much appeal at this point. If I had to make a recommendation to you, my recommendation would be to put a string on the money; to provide the money but put a string on it until we come back and can convince you that, No. 1, it is affordable; and No. 2, that it is time to go into production.

What we are really asking in this particular fiscal year is to be allowed, assuming we get a go-ahead, to let long lead funds for 90 missiles, and that would happen in June. And actually, believe it or not, the bulk is going to go to Raytheon. It is carry-over from 1984.

There is about $130 million appropriated in 1985. I think if I were in your seat, before we actually ramped up to those missiles, I would want us to come back and report to you. And whether you wanted us to or not, I would feel compelled to do that, because it is a very big decision.

But what I would say, Senator, if you do not provide us the money in 1986 and we go forward with this in 1985, that does not make much sense. The decision point is right now, and we will not even obligate the money that we have in hand from 1984 and 1985 unless we convince ourselves in the Pentagon that and more importantly, convince Secretary Weinberger that the program is affordable.

Senator **Goldwater**. Hughes is putting up, I understand, $200 million of their own money?

Dr. **Cooper**. Senator, I think if they have a reasonable expectation that there will be a production program that they can at least compete for, with the dollars involved, they will hang in there and put up whatever the amount of money is required to complete the full scale development program.

No. 1, there is a profit motive involved in the long term and a business motive. No. 2, I think their pride is on the line a little bit.

But if they have no reasonable expectation that there is going to be production to follow, I do not know what they are going to do at that point.

AMRAAM VERSUS SPARROW COSTS

Senator **Bingaman**. Let me just ask one more thing. My notes show that 2 years ago the testimony to this committee was that

AMRAAM would cost less than Sparrow. And now I gather it is estimated at twice the price of the Sparrow. Is there a figure that you have to come in at before you will OK this thing or recommend to the Secretary of Defense that he go ahead and recommend it to the Congress? Or are you just trying to get the price down as low as you can and then go?

Dr. COOPER. I guess I really cannot answer what that figure is in the mind of our Secretary or the mind of the Congress. But let me give you a couple of touchstones, if I could.

Last year, as opposed to 2 years ago, we testified that in 1978 dollars—and those were the base year dollars that the program has been estimated in—the price of the missile was $200,000 a copy. On the high side right now, if we were to do nothing about cost, and if we were to take the cost estimates that we had in January, we would estimate the cost of that missile at $230,000 a copy, roughly a 15-percent increase.

I cannot tell you how much we have to come down, but I think I can safely say if we do not come in below $230,000 a copy we probably will not even get out of the Pentagon with our proposition.

Senator BINGAMAN. And what does the Sparrow cost?

Dr. COOPER. The Sparrow costs, I think, in today's dollars is about $183,000 a copy.

Senator BINGAMAN. Is that comparable to the figures you just gave me?

Dr. COOPER. No, that is 1985 dollars. Let me see if I can give you an apples to apples comparison. And I want to be very general about this, but talking on an apples to apples basis, a Sparrow costs on the order of $200,000 a copy and an AMRAAM on an order of $400,000 a copy.

Now, that is very round numbers. I cannot be much more precise than that right now. I think your figure, if you used it, of 2 to 1 is probably about right, but in terms of the capability of AMRAAM is a very, very significant improvement over the Sparrow.

My colleague here is chomping at the bit to say something, so I am going to let him go.

General RUSS. I applaud your comments, Dr. Cooper. I was not sure you had all those facts in your mind. I was going to help you, but evidently you did not need to be helped.

What I would say, though, on the capability of the missile, I think it is significant that the capability of the AMRAAM as far as in the probability of kill is significant over what the current AIM-7 is. The current firing doctrine, Senator, would fire two AIM-7's at an airplane and you would get a kill of about [deleted].

For AMRAAM we are forecasting you would fire one missile and you would get a kill about [deleted] of the time. Now, that does not mean that it is [deleted] as good or anything like that, but it does mean that you would have a significantly higher capability to kill airplanes with this missile, in addition to the range and so forth.

So we look at that very carefully when we try to run these cost analyses and decide how much would we pay for an AMRAAM type of capability. And I cannot give you a figure. I have had analyses that say three and four times what it costs. I think we just have to balance it all with reason and good judgment, and based on inventory levels and how many we really need and can we really afford it and put it in the budget.

Senator BINGAMAN. Let me just ask what damage we would do if we were to just put off authorizing any money for production of these AMRAAM missiles for another year.

Dr. COOPER. Senator, not to give an ultimatum—we are not in that position. But I think it would do terrific damage if the decision were not to go forward, because we are poised and ready to start production. If the concern is affordability, the worst thing we can do right now is to put a 1-year hiatus in the program, because all that will do is drive the cost up further.

We are really at a decision point right now as to whether we want to go or no-go. And I quite frankly, from an acquisition point of view, I do not think it makes good sense to put a 1-year gap in the program.

Again from the committee's point of view, I think, that, before we are allowed to obligate or expend funds on production, committee should ask us to come back and explain where we are and justify that to you. I think that is perfectly appropriate. But I think the committee probably needs to make a decision, just like we do, as to whether or not we are going to enter production.

Senator BINGAMAN. It is hard to make a decision when you do not know anything about the cost.

Dr. COOPER. Well, I would propose that we come back and tell you about the cost, and I think we will have that cost in hand certainly before you go into your conference this year. At least we will have a decision out of our Secretary before that point in time, and I do not think that is unreasonable on your part, to expect that, given the moneys that we are looking at.

I would like to make a couple of comments, though, if I could, to amplify on General Russ' remark. It is not only kill probability that we are talking about here, it is whether we live or die. This capability gives us an ability to stand off much further and prosecute the other guy. Right now we outrange him, we can outsee him.

If we get ourself into a posture where he has the range and he gets first look, first shot, we may not even get an opportunity to shoot [deleted] Sparrows. So that is one thing to keep in mind.

The other thing is that—and I am not trying to make the cost look insignificant. It is a very expensive program we are talking about—I have heard General Russ use figures that our tactical Air Force, if you valued it at its present value, is probably on the order of $100 billion, rubber on the ramp.

When you look at this particular program, which is the killing end of that force in the future, and particularly when you put ATF in it, we are talking about something that is on the order of 8 percent of that total force. We have some very fine aircraft in the Air Force today, and again I thank the committee for their tremendous support, but I think in the eighties it is very important that we go about weaponizing those systems.

We need to put the modern technology weapons on them. We are doing that, and AMRAAM I think is the key weapon in our air-to-air fighter force of the future. That is not, again, to downplay the significance of the cost of AMRAAM. What we are talking about here is roughly a 15-percent increase over what we originally thought the program was going to be. That is not a small amount of money.

But again, when you look at the significance of that weapon, Senator Goldwater, I personally would find in favor of it. But I also recognize you have yet to be convinced and will continue to push against that stone for a while.

Chairman GOLDWATER. Just get all the problems out of it.

General WILLIAMS. Sir, if I could continue to look at this in a specific way to highlight some of the comments that have been made. If you assume that we represent the blue fighter, with the current Sparrow we would fire with a distance between the aircraft and the time that the missile hit the other aircraft and destroyed it of, say, [deleted]. On the other hand, if we had an AMRAAM type missile, we could then achieve the same kill at a distance separating the two aircraft of [deleted]—very important to survivability and the ability to strike more than one target.

Additionally—and this is another important capability, represented by this—should it be necessary, and oftentimes, as you know, it is, to fire or to launch and leave, fire and leave, then you can do that at a range of [deleted] nautical miles.

I would like to add a footnote to this. If we decide to change colors and they have that capability and we do not, then that is where Dr. Cooper mentioned that it is to a degree a point of survival with the munitions capability represented by that air-to-air missile.

Dr. COOPER. I want to make a point. I am not a qualified fighter pilot, because I cannot do all these fancy turns with my hands that they do when they describe an engagement. But back to your point, Senator Bingaman. With the Sparrow missile today, when you fire it, it uses the radar in the aircraft to illuminate the other guy. So when you fire the missile, you have to continue to drive in behind the missile to illuminate the adversary aircraft.

Now, it may be that you end up killing him, but while you are driving in, he may get a shot off of his own, and in the process, you destroy him but he gets his missile off and he ends up destroying you. That is not a very good outcome.

With the AMRAAM, it is an active radar missile. You fire it and it has a radar in the head of it, and I tell you, that is a technological wonder, to be able to put that radar capability in a 7-inch cavity. When you fire it, the radar in the head of the AMRAAM takes over and you can break off and go about your business and go prosecute another target or get the heck out of there.

That is one of the things that is really significant. It is a faster missile and, as General Williams shows you, even if you drive in, you are [deleted] that we are today with the Sparrow.

IFF SYSTEM

Senator BINGAMAN. Mr. Chairman, let me just ask a related question. We had some testimony about the problems with this IFF system, identification friend or foe. To what extent are these charts you are showing us here realistic, in light of the problems we have got there?

I mean, to what extent is our capability to use this missile degraded by virtue of problems in that IFF system?

Dr. COOPER. I will let General Russ amplify on this a little bit. Of course we are assuming here that we have identified the red guy.

Senator BINGAMAN. I am just wondering if that is a valid assumption.

Dr. COOPER. I think in some circumstances it is, Senator. But we are not where we would like to be today in the area of IFF. That is a very difficult problem. We have a number of programs that are ongoing; one that is called the Mark XV. [Deleted.]

That problem is not completely solved and I doubt that it ever will be completely solved. So to the extent you cannot identify the adversary, that is a limitation. It also depends upon what your rules of engagement are.

I will ask General Russ to comment more fully.

General RUSS. I will just say a couple of words, because I think the next few charts will get into that, Senator Bingaman. [Deleted.] is something different. We are putting into the F-15 [deleted].

We are also looking at several other techniques to make positive identification. So we have several ways to do that today. They are not all in the force yet. They are not all modified into the various airplanes, but there will be a combination of systems.

No single system is foolproof and that is why we believe we need more than one. So we have a little redundancy and we reduce any possible fratricide that could happen.

[Chart deleted.]

General WILLIAMS. One more way to look at the capability of the current Sparrow against the capability of the AMRAAM. On the right side of the vertical line is presented the envelope. Anywhere within this envelope relative to the fighter, the red fighter, the AMRAAM is more lethal.

To put it in more specifics, for example, we can fire the AMRAAM [deleted] of a fighter and have it be effective. If we have a Sparrow, we have to go to something like [deleted].

More important, particularly for the more probable engagements, head-on, we could fire—if necessary, we could fire at [deleted]. We have to move in to around [deleted] for the Sparrow. And at the same time, as has been pointed out, you must maintain radar illumination or, in other words, generally maintain your heading against your opponent. With the AMRAAM, you can turn and leave and engage another fighter if necessary, with the launch-and-leave active radar seeker on the AMRAAM.

Dr. COOPER. Senator, I want to make one last point. We have beat AMRAAM to death, but one thing that gets lost in this discussion once in a while is how much technology is really involved in this program. The Navy has had an active missile for some time now. It is called the Phoenix, and what they have managed to do there is to put a radar in a 12-inch diameter missile head.

What we are attempting to do here, and so far, so good—in fact, it looks very good—is to put that same sort of capability into a 7-inch cavity.

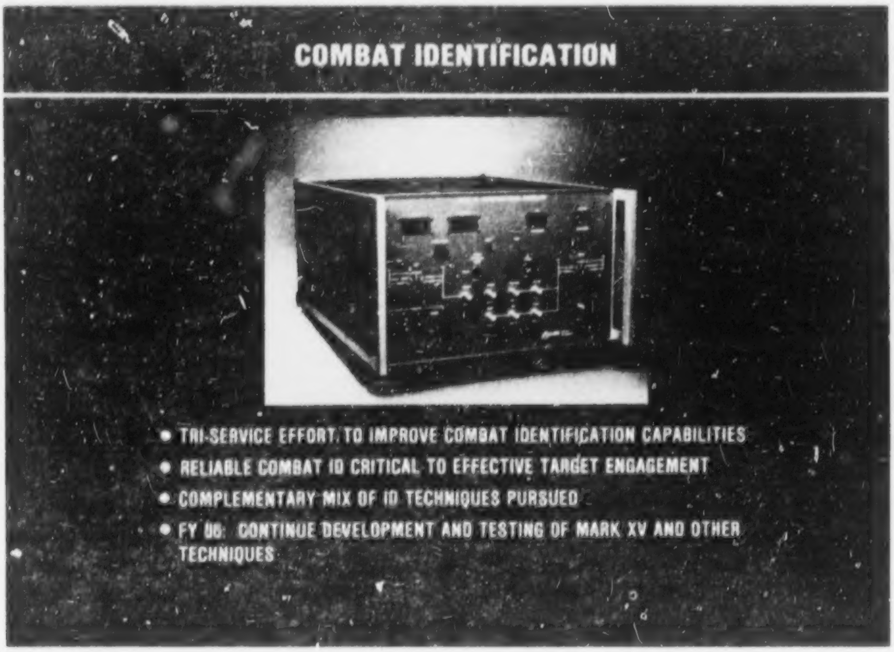
And if you will look at this picture here, you will see the radar depicted. That is one heck of a challenge, and the thing that has allowed us to do that is the micro-miniaturization in the computing capacity, the capacity that we now have available to us today.

But, heretofore, we have had to put that capability in the aircraft itself. Today, due to our advancements in technology, we can put it in the head of a missile. And that is kind of back to what Senator Glenn was talking about: Where do you put your capability, in the aircraft or in the weapon? We think we have a nice mix, and this is our silver bullet in the future.

Let us move on, unless you want to talk more about that, Senator.

Chairman GOLDWATER. No.

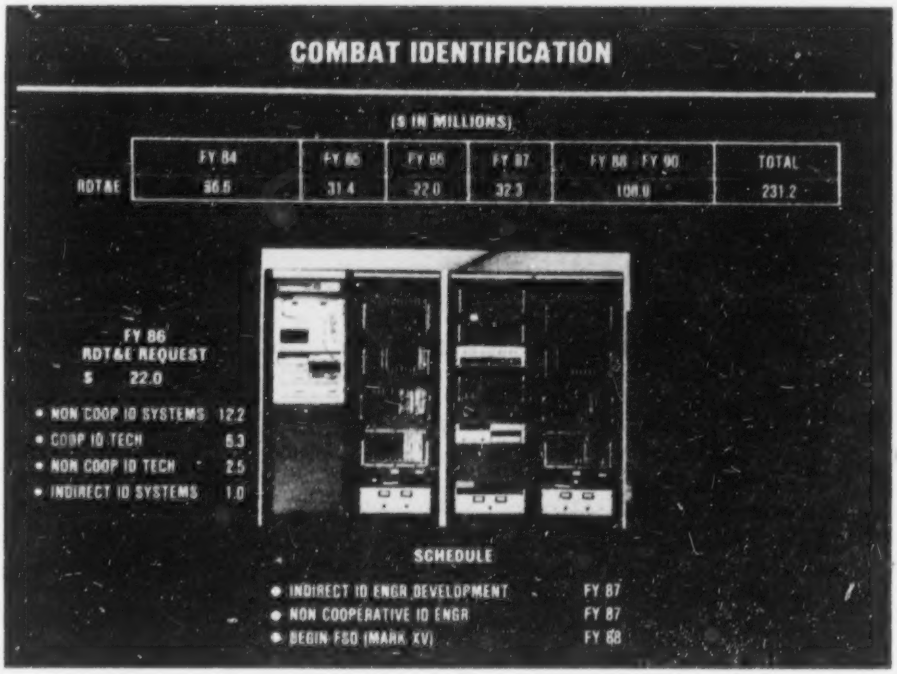
Dr. COOPER. Let us move on to the next subject.



COMBAT IDENTIFICATION

- TRI-SERVICE EFFORT TO IMPROVE COMBAT IDENTIFICATION CAPABILITIES
- RELIABLE COMBAT ID CRITICAL TO EFFECTIVE TARGET ENGAGEMENT
- COMPLEMENTARY MIX OF ID TECHNIQUES PURSUED
- FY 86: CONTINUE DEVELOPMENT AND TESTING OF MARK XV AND OTHER TECHNIQUES

General WILLIAMS. This moves, Senator Bingaman, right into your area of combat identification. This is the ability to be able to tell who is your friend, who is your foe, and to manage your forces. This is something that is high on the list for the Europeans and high on the list for all intense combat. You can deal with it in three ways, as we represent here.



COMBAT IDENTIFICATION

($ IN MILLIONS)

	FY 84	FY 85	FY 86	FY 87	FY 88 - FY 90	TOTAL
RDT&E	36.5	31.4	22.0	32.3	108.0	231.2

FY 86
RDT&E REQUEST
$ 22.0

• NON COOP ID SYSTEMS	12.2
• COOP ID TECH	6.3
• NON COOP ID TECH	2.5
• INDIRECT ID SYSTEMS	1.0

SCHEDULE

• INDIRECT ID ENGR DEVELOPMENT	FY 87
• NON COOPERATIVE ID ENGR	FY 87
• BEGIN FSD (MARK XV)	FY 88

A noncooperative ID system. This is where you have an identifier of the enemy whether he cooperates or not. And the cooperative system, you have an interrogator on board where you would respond there to interrogation from your friendly side and assist the interrogator, so to speak, to know that you are friendly.

The noncooperative, of course, is those that would identify the enemy whether he engages or participates in that or not.

There is another one, indirect, which means you do it through command and control and perhaps procedural or rules of engagement. We are addressing each of these and we want to begin full scale development here in fiscal year 1988. This is an important program and we think that we have scoped it about right, with a request of $22 million for this fiscal year.

Chairman GOLDWATER. One of the major problems here is in Germany. Germany does not like the IFF and they are being very stubborn about it. Their IFF in World War II was not that good, but neither was ours. And I think this is a very important part of the communications system and it is one that I think is taking up most of our discussion right now.

Dr. COOPER. It is, Senator. The United Kingdom, France, the United States, have all agreed on the frequency band. That is the argument. It is D-band. It used to be the old L-band. The Germans, however, have not yet come on board.

I think the best thing for us to do is press on, and that is what we intend to do with the Mark XV. We are going to go to our DSARC here in the not too distant future. I think we need to keep putting the pressure on the Germans to come on board, and I am hopeful that in the long term they will.

It is a frequency allocation issue. In fact, it is kind of strange. I think in Germany that is controlled in the postal department.

General RUSS. The post office controls their frequency allocation and that is a problem. I used to think we had bureaucratic problems in the United States, but they seem to have a few themselves.

MARK XV SYSTEM

Senator BINGAMAN. Let me just ask, Mr. Chairman, does the Army plan to use this Mark XV system on their air defense units?

General WILLIAMS. Yes, sir, they do. To the extent to which they wish to incorporate it they are trying to determine how, based upon cost.

Senator BINGAMAN. I was told that they did not plan to use it with the Stinger teams.

General WILLIAMS. The reason that they are uncertain about that is cost. They have, I believe, something like 18,000 Stinger requirements, and that just may be more than they can afford. We are looking at something like $65,000-per-unit cost for the Mark XV in production, and I think you can appreciate their concern.

But we are looking into options.

Senator BINGAMAN. Who will build that?

General WILLIAMS. Bendix, I believe. Bendix and Texas Instruments are currently the lead teams building development models. There will be a competition for TSD and production.

Senator BINGAMAN. $65,000. That is the price per unit?

General WILLIAMS. We estimate now in production $65,000. That would be $65,000 each for full-up interrogator and transponder.

Senator BINGAMAN. What is the price on that, the cost?

General WILLIAMS. $65,000.

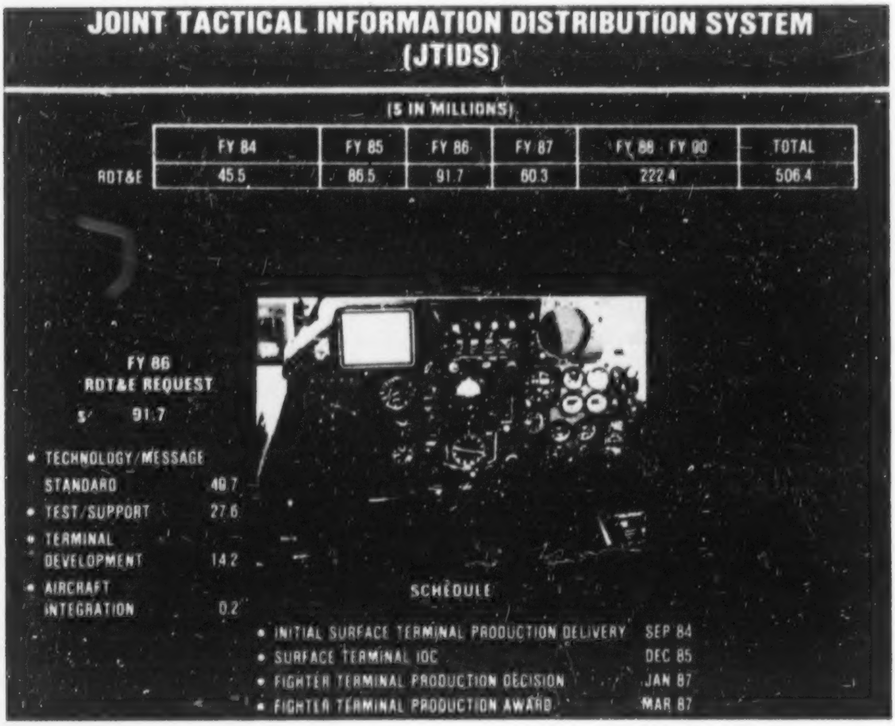
Senator BINGAMAN. And how many units?

General RUSS. We are talking about 11,000 for the Air Force, roughly, and then some for the Navy and the Army. I am not sure the total amount. The Navy and the Air Force have pretty well determined how much they need. The Army is still doing some studies to see how many they would need. But as an example, we have over 41,000 of the Mark XII's in the inventory today. So it is large, large numbers of airplanes.

Dr. COOPER. We should be able to have competition in the program as well, Senator, with that volume.

General WILLIAMS. We have Bendix and Raytheon teamed. We have TI and Teledyne and E-Systems teamed.

Senator BINGAMAN. Thank you, Mr. Chairman.



JOINT TACTICAL INFORMATION DISTRIBUTION SYSTEM
(JTIDS)

($ IN MILLIONS)

	FY 84	FY 85	FY 86	FY 87	FY 88 - FY 90	TOTAL
RDT&E	45.5	86.5	91.7	60.3	222.4	506.4

FY 86
RDT&E REQUEST
$ 91.7

TECHNOLOGY/MESSAGE STANDARD	49.7
TEST/SUPPORT	27.6
TERMINAL DEVELOPMENT	14.2
AIRCRAFT INTEGRATION	0.2

SCHEDULE

INITIAL SURFACE TERMINAL PRODUCTION DELIVERY	SEP 84
SURFACE TERMINAL IOC	DEC 85
FIGHTER TERMINAL PRODUCTION DECISION	JAN 87
FIGHTER TERMINAL PRODUCTION AWARD	MAR 87

General WILLIAMS. Moving now into the joint tactical information distribution system, referred to as JTIDS. This is important to us to be able to transmit data to our forces in a jamming environment, and I emphasize the jammed environment.

It is displayed to them on their displays within the cockpit, and this is a data system, Senator. However it does have a limited backup voice capability. We are looking to a production award in March of 1987.

Chairman GOLDWATER. Now, this is your current plan for achieving the inter-operability between the Navy's JTIDS and the Air Force's EJS system?

Dr. COOPER. Yes, Senator, I think we did reach an agreement on that, and when we were here last year we were in the process of discussing that. The agreement is as follows, that [deleted] bands that we will operate in is L-band, which provides compatible with the Navy. They are in L-band.

We will use the TDMA format, time division multiple access. Their JTIDS uses distributed time division multiple access, but they will be backward compatible with TDMA. So we have connectivity and will be working in the same frequency, and speaking the same language in that we will be using TADILJ.

So the answer to the question is yes, we have achieved that compatibility.

Chairman GOLDWATER. Your system will operate at its full antijam capacity when operating with the Navy?

Mr. COOPER. No, sir. The Navy says that they do not need the higher level of jam resistance that we need, so the band that we are interoperable in is the L-band, which is the lower AJ portion of it. In the wartime band, we are not directly interoperable with the Navy.

Chairman GOLDWATER. I think you all should go back to the flags and that will make the Navy happy. They have given us more problems with communications in my experience in the military than almost any other source.

General RUSS. The Air Force and the Army both agree that the TDMA is the place to be. The Navy has some different requirements, but the Air Force and the Army agree, and our programs for the terminals and so forth are identical, in essence. There are some very small, minor differences. But the Army and the Air Force are identical.

Chairman GOLDWATER. I hope you will keep us posted on the progress on this, and if you need any help I would not hesitate to go to the Navy about it.

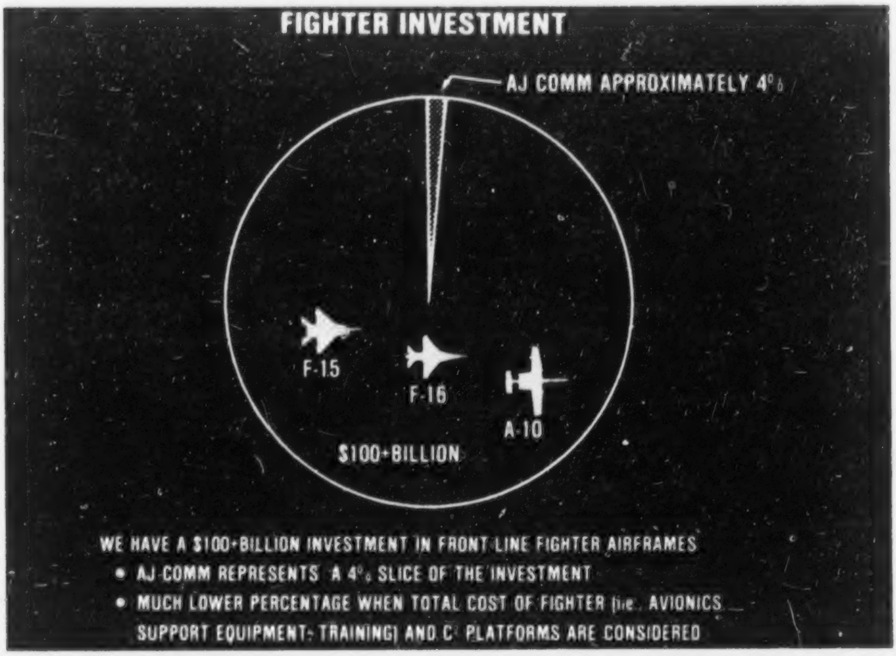
Dr. COOPER. Senator, I just might point out that the Navy in their communications equipment and their JTIDS does not go to the higher level of jam resistance that we have. So it is not a matter that we cannot interoperate with them; they just do not have that capability at all today.

They say they do not need it. We believe we do, because if you look at the intensity of a conflict that might occur in Europe, with the number of jammers, the intensity and so forth, we think we need that high level of jam resistance.

Chairman GOLDWATER. It is not all that big a problem. I would just like to see you push ahead and get it solved.

Dr. COOPER. I think we have got it, sir.

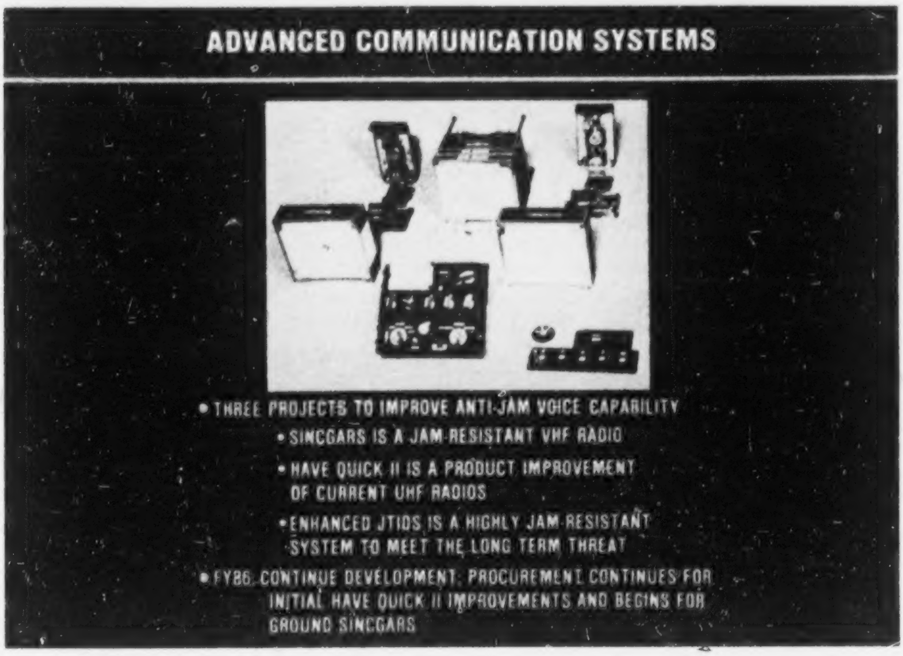
Chairman GOLDWATER. All right, fine.



FIGHTER INVESTMENT

WE HAVE A $100+BILLION INVESTMENT IN FRONT LINE FIGHTER AIRFRAMES

- AJ COMM REPRESENTS A 4% SLICE OF THE INVESTMENT
- MUCH LOWER PERCENTAGE WHEN TOTAL COST OF FIGHTER (i.e. AVIONICS SUPPORT EQUIPMENT, TRAINING) AND C^3 PLATFORMS ARE CONSIDERED



ADVANCED COMMUNICATION SYSTEMS

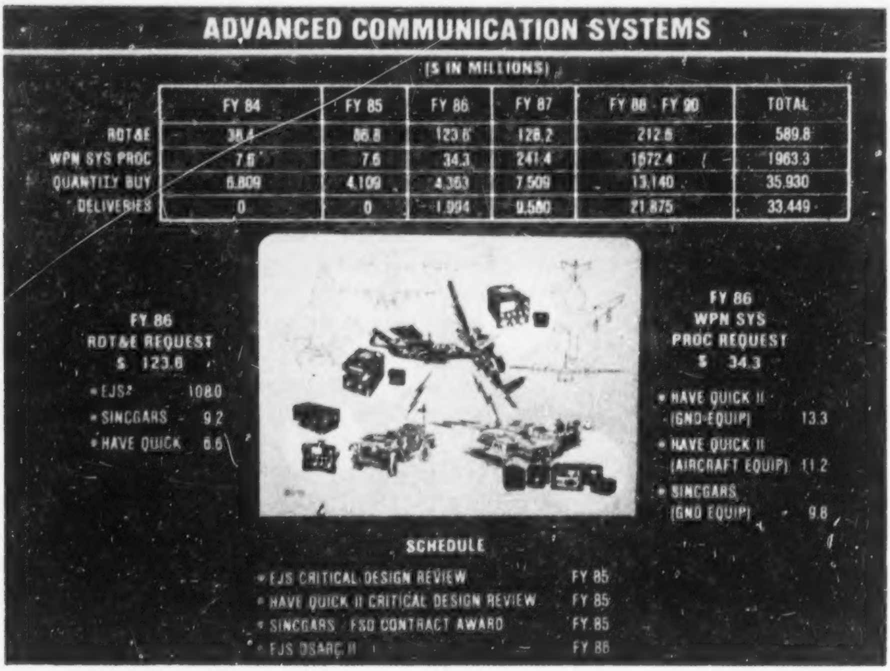
- THREE PROJECTS TO IMPROVE ANTI-JAM VOICE CAPABILITY
  - SINCGARS IS A JAM-RESISTANT VHF RADIO
  - HAVE QUICK II IS A PRODUCT IMPROVEMENT OF CURRENT UHF RADIOS
  - ENHANCED JTIDS IS A HIGHLY JAM-RESISTANT SYSTEM TO MEET THE LONG TERM THREAT
- FY86: CONTINUE DEVELOPMENT; PROCUREMENT CONTINUES FOR INITIAL HAVE QUICK II IMPROVEMENTS AND BEGINS FOR GROUND SINCGARS

General **Williams**. Again on the advanced communications systems. On the left screen, Senator, we are looking at roughly a 4-percent investment in the kind of leveraging that gives us force capability. I do not have to belabor the point. I think that if you cannot talk in a voice environment in combat you lose a great deal of your force capability. The point simply made here is that we need that. It is worth the investment.

As we look to the more specific systems, in terms of SINCGARS, which is a jam resistant VHF radio to let us have interoperability with the Army ground forces, that will do that for us. And Have Quick II is a UHF band, but that gives us a capability in the near term across a wide array of systems that we need. It is affordable.

And then the enhanced JTIDS, which is a considerable improvement, but you do not get anything without paying for it. It is a little more expensive, but we do not need that in terms of voice for an anti-jam with the high level intensity threat that Dr. Cooper mentioned, particularly in the European environment.

So we think we need to continue development, but we do have a well scoped out program that is designed to fit our needs both in the near term, with the Have Quick, and in the far term with the enhanced JTIDS to provide us a voice anti-jam capability.



ADVANCED COMMUNICATION SYSTEMS

($ IN MILLIONS)

	FY 84	FY 85	FY 86	FY 87	FY 88 - FY 90	TOTAL
RDT&E	38.4	86.8	123.6	126.2	212.8	589.8
WPN SYS PROC	7.6	7.6	34.3	241.4	1672.4	1963.3
QUANTITY BUY	6,809	4,109	4,363	7,509	13,140	35,930
DELIVERIES	0	0	1,994	9,580	21,875	33,449

FY 86
RDT&E REQUEST
$ 123.8

• EJS^2	108.0
• SINCGARS	9.2
• HAVE QUICK	6.6

FY 86
WPN SYS
PROC REQUEST
$ 34.3

• HAVE QUICK II (GND EQUIP)	13.3
• HAVE QUICK II (AIRCRAFT EQUIP)	11.2
• SINCGARS (GND EQUIP)	9.8

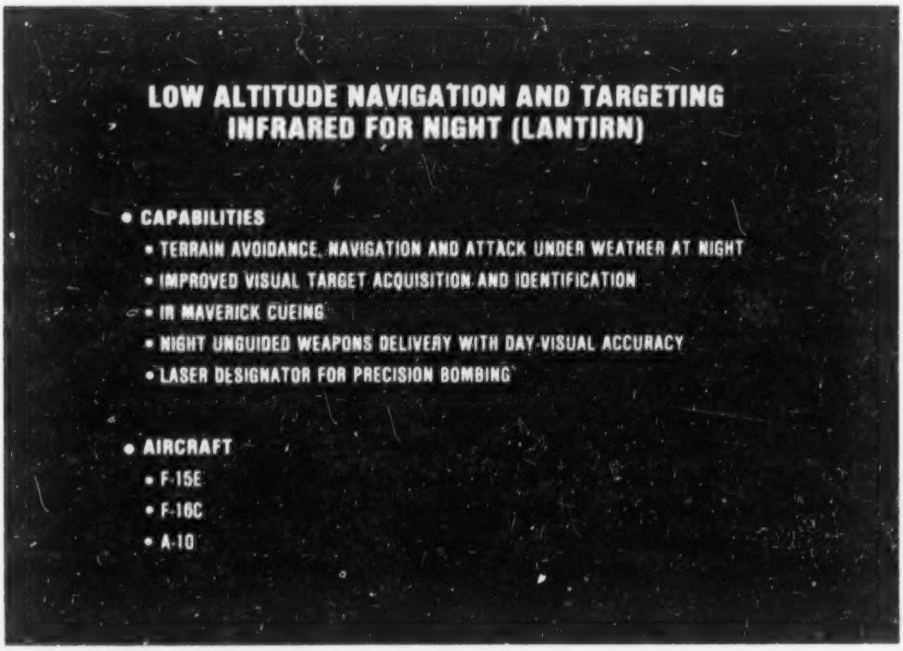
SCHEDULE

• EJS CRITICAL DESIGN REVIEW	FY 85
• HAVE QUICK II CRITICAL DESIGN REVIEW	FY 85
• SINCGARS FSD CONTRACT AWARD	FY 85
• EJS DSARC II	FY 86

More specifically, I would just go through this quickly unless you wish to talk more. These are the kind of moneys we are looking at for this year, and to continue with critical design reviews and the DSARC II for the enhanced JTIDS.

Moving now to an interesting program called Lantirn, which you are familiar with, sir.

This is designed to give us the capability to operate at night under the weather. Here it is shown mounted on an F-16. You have two pods. One is the targeting pod and the other is the navigation pod, and I will talk about each of those separately.



LOW ALTITUDE NAVIGATION AND TARGETING INFRARED FOR NIGHT (LANTIRN)

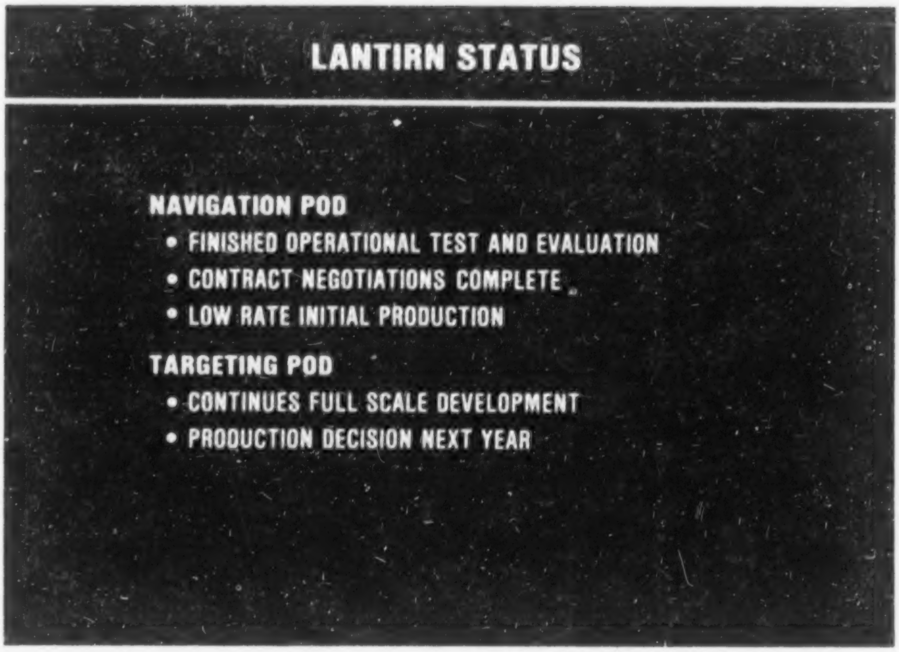
- CAPABILITIES
  - TERRAIN AVOIDANCE, NAVIGATION AND ATTACK UNDER WEATHER AT NIGHT
  - IMPROVED VISUAL TARGET ACQUISITION AND IDENTIFICATION
  - IR MAVERICK CUEING
  - NIGHT UNGUIDED WEAPONS DELIVERY WITH DAY-VISUAL ACCURACY
  - LASER DESIGNATOR FOR PRECISION BOMBING
- AIRCRAFT
  - F-15E
  - F-16C
  - A-10

The capabilities for Lantirn, of course, are significant to us as we attempt to broaden the window and give us something like the 17-hour day guaranteed around the clock, to have terrain avoidance, fly down near the earth and evade enemy defenses, and then navigate and attack under weather and at night.

This will give us an improved visual target acquisition with IR Maverick queuing. In other words, what we could do there is slave the Maverick seeker head to where it sees the target and then can launch against it. And we will have a laser designator for precision bombing, that we think will be very important to us, particularly at night.

And we plan to put the Lantirn pods on the F-15E, a total of 392; we will have 200 on the F-16C; and 100 on the A-10, for a total of 692. That will be eight short of the total of 700. Those eight will be for spares.

Chairman GOLDWATER. I wonder, General, if you could describe the technical problems that still exist for both navigation and targeting pods.



LANTIRN STATUS

NAVIGATION POD

- FINISHED OPERATIONAL TEST AND EVALUATION
- CONTRACT NEGOTIATIONS COMPLETE
- LOW RATE INITIAL PRODUCTION

TARGETING POD

- CONTINUES FULL SCALE DEVELOPMENT
- PRODUCTION DECISION NEXT YEAR

General WILLIAMS. Senator, we think that we do not have a technical problem with the navigation pod. In fact, we would like to move toward production with that, limited production or a low rate of production, because we think the navigation pod looks very good. We have flown it quite a few hours, we have flown it at low altitude and at night, and it looks very good.

The targeting pod, we had some problems with jitter in the Forward Looking Infrared (FLIR) Sensor and with the resolution in the picture. We think we will have that solved by next year and that is when we will come back with a request to move toward production, a production decision on that.

So we do have some limited problems with the targeting pod, but we think the navigation pod is OK.

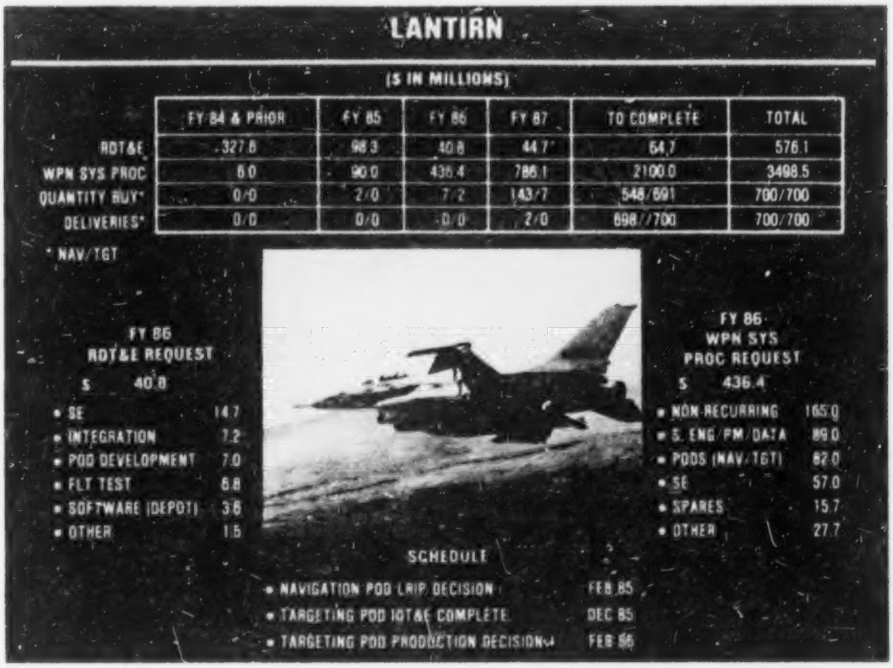
Chairman GOLDWATER. How will these problems affect the fixed price production contract that I understand you have reached?

Dr. COOPER. Let me comment on that, if I could. Senator, the only problem that we see right now with the navigation pod is not really a technical problem. The R&M goals that we established for the pod we did not quite meet. But I personally think it is important to go into this low rate production with the navigation pod.

We are only talking about producing two so that we can work some of those problems out, and we are going to make that part of the contract that you mentioned 2 years ago in our discussions on Lantirn. You kind of made us an offer we could not refuse, and in essence the committee's support was contingent upon us being able to negotiate a fixed price contract for the entire buy.

We are close to doing that right now. We are to the point where we are dotting a couple of "i's" and crossing a couple of "t's", and I personally want to make sure that production decisions are based on criteria being met, as opposed to dates. And I think we need to hold the contractor's feet to the fire there, because one of the problems we had in AMRAAM is that we tied our production decision to a date, and when that date came and we could not go into production because the contractor was behind and we lost our production options.

We want to assure you that that is not the case with this fixed price contract, because then it would be fixed price only in name. And if we then came up 2 years from now and did not meet a date in the contract, the barn door would be open and the horses would be gone.



LANTIRN

($ IN MILLIONS)

	FY 84 & PRIOR	FY 85	FY 86	FY 87	TO COMPLETE	TOTAL
RDT&E	327.8	98.3	40.8	44.7	64.7	576.1
WPN SYS PROC	6.0	90.0	436.4	786.1	2100.0	3498.5
QUANTITY BUY*	0/0	2/0	7/2	143/7	548/691	700/700
DELIVERIES*	0/0	0/0	0/0	2/0	698//700	700/700

* NAV/TGT

FY 86
RDT&E REQUEST
$ 40.8

• SE	14.7
• INTEGRATION	7.2
• POD DEVELOPMENT	7.0
• FLT TEST	6.8
• SOFTWARE (DEPOT)	3.6
• OTHER	1.5

FY 86
WPN SYS
PROC REQUEST
$ 436.4

• NON-RECURRING	165.0
• S. ENG/PM/DATA	89.0
• PODS (NAV/TGT)	82.0
• SE	57.0
• SPARES	15.7
• OTHER	27.7

SCHEDULE

• NAVIGATION POD LRIP DECISION	FEB 85
• TARGETING POD IOT&E COMPLETE	DEC 85
• TARGETING POD PRODUCTION DECISION	FEB 86

So we are in the process at this moment of getting Martin-Marietta to agree to contractually establishing criteria in the contract that has to be met. One of those criteria will be R&M goals being met. If you look at the slide there, you will notice that in the first 2 years of production, this year we are talking about going into production with two pods and those are navigation pods. Next year it will be seven navigation pods and then initiation of two targeting pods.

That is a very, very low rate. The key year is really 1987, where we go up to 143. That is where we want to make sure that we have the contractor contractually tied to meeting criteria before we ramp up to rate production. I think we are going to get that.

And I am getting a little bit ahead, but I think what we are going to be able to do is negotiate that fixed price contract within the cap that has been set and get 700 pods, both navigation pods and targeting pods.

Chairman GOLDWATER. Well, of course, the extreme high price of this system has always been a problem. I remember at one time we were looking at around $6 million per cockpit. And this committee, as you know, has encouraged the Air Force to evaluate other, less costly FLIR systems for the night mission.

And I wonder if the Air Force has given any other consideration to systems such as the one that is under evaluation by the Marine Corps, what they call "Cheap Night."

General RUSS. Senator, we have looked at a variety of different types of night systems, from the Navy's F-18 pod to various types of modifications that could be put on our F-16's and our A-10's. We have also looked at the Marines' Cheap Night program, which is currently undergoing some evaluation.

There is not a program out there that does what the Lantirn program does. There are FLIR's out there that will allow you to see at night. There are designators that will allow you to designate. But the combination of the different things that all go into the Lantirn system, which are two FLIR's, a terrain-following radar, a capability to lase at night and track the target, all of these things and automatic switching between targets and head-up display with a wide field of view, all of those things, there is just not such a thing out there any more.

So in our testing, we have found that we need those sorts of systems. And the main reason we have had difficulty with the Marine Corps system is that it does not give you a height above the ground. In our simulations, we found that without some sort of correlation, direct correlation between a radar input from the height above the ground, when you get into a situation where you have rising terrain or a change in terrain, we found our fellows flying into the ground in the simulator time after time again.

Even though you have a sense when you are flying that you can tell depth, at night, as you well know, it is very difficult to tell your depth perception. So those systems are all right in a low threat environment where you are not really real close to the ground and you are not at very high speed. I think the Marines will find that it is a help to them. But it is not going to provide them the type of deep interdiction capability that the Air Force is trying to get.

Chairman GOLDWATER. Well, you talk about an arrangement with the contractor. I think the time has been reached, probably some time ago, where we should tell them that this is what we are going to pay you and no more.

Dr. COOPER. Senator, I think that is exactly what we are doing.

General RUSS. We did that, sir, and we put on a cap, for $2.31 billion and 700 pods, and they had some very, very tough negotiations. And the fact that this committee put the type of language they have in the previous reports and the fact that it was communicated to them that we were not going to pay an exorbitant price for this and that we were going to cap the entire program, the message got to the contractor and they have in fact agreed with a handshake to do that.

Now, these modifications to the contract that Dr. Cooper brought up are things that we believe, after we have had the opportunity to review the contract up here in headquarters, that we think that these are some things that also should be included in this contract. We do not have any doubt that they will be put into the contract.

It is just a matter of saying that we have not actually signed or dotted all the "i's" and crossed all the "t's" yet on it. But we do in fact have a 7-year plus contract ready for signature at a firm fixed price, and I think that is significant.

Chairman GOLDWATER. I am very glad to hear it, because I have told the president of the company twice, that we are not going to pay them a cent more.

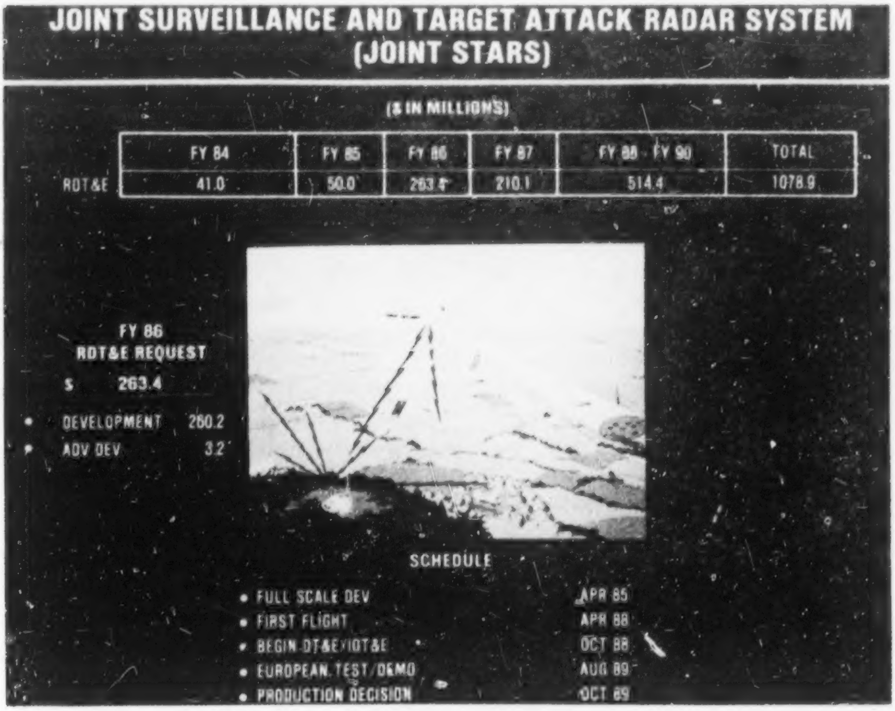
Dr. COOPER. Senator, we had a contract, but quite frankly I thought there were a couple of loopholes in the contract, and that is why we do not want to negotiate a contract that 2 years from now he is out from under. So we are trying to tighten up a couple of parts of the contract.

You may want to speak to him again here at some point in the not too distant future. That might be helpful.

Chairman GOLDWATER. I found the most effective way is to just tell them, this is what we are going to pay you; if you do not want the business, so be it.

General WILLIAMS. I want to be sure, sir, in case you do some adding on this, the $2.31 billion was in fiscal year 1980 dollars. This is in then year dollars, and as we described the cap we are holding to it.

The navigation pod. We have flown, for instance, 40,000 miles, Senator, below 500 feet and 17,000 miles below 250 feet. So we think we have got some pretty good test data on that, and I think we have talked about that already.



JOINT SURVEILLANCE AND TARGET ATTACK RADAR SYSTEM
(JOINT STARS)

($ IN MILLIONS)

	FY 84	FY 85	FY 86	FY 87	FY 88 - FY 90	TOTAL
RDT&E	41.0	50.0	263.4	210.1	514.4	1078.9

FY 86
RDT&E REQUEST
$ 263.4

- DEVELOPMENT 260.2
- ADV DEV 3.2

SCHEDULE

- FULL SCALE DEV APR 85
- FIRST FLIGHT APR 88
- BEGIN DT&E/IOT&E OCT 88
- EUROPEAN TEST/DEMO AUG 89
- PRODUCTION DECISION OCT 89

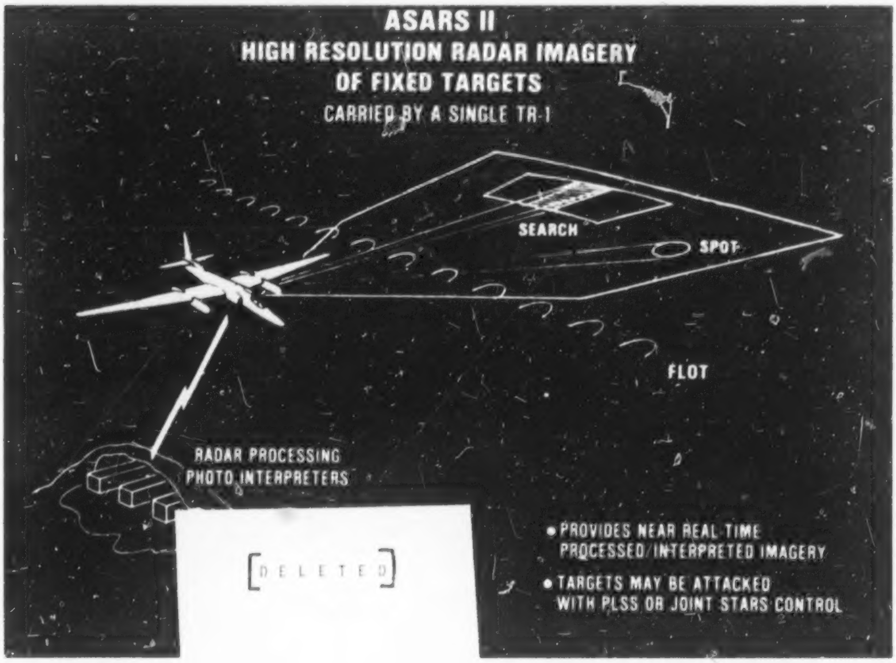
Moving now into the Joint STARS Program, or the joint surveillance and targeting and attack radar system. That will be on the C-18, or virtually the Boeing 707. This is primarily in support of the Army, to be able to look at moving targets, moving ground targets. We will detect and track with the radar and bring aboard the aircraft and they will have some battle management capability there.

And we look to a full-scale development decision in April 1985.

More specifically, we looked at $263 million in fiscal year 1986 for development of the system, and then we will be moving toward a very important milestone, which will be European test and demonstration in 1989, to hopefully be followed by a production decision in October of that same year. And I am going to talk a little bit more about Joint STARS in a minute as I try to put that in perspective with PLSS and ASARS.

A number of questions have come up as to how the ASARS, which is an advanced synthetic aperture radar system, on the TR-1, and the PLSS, which is a precision location strike system on the TR-1, and Joint STARS, which I just talked about, on the Boeing 707 or C-18, how all of that fits together and makes good sense as we view the target base, defined as the ground threat, for time-sensitive targets. That means targets where we have to hit very time critical or they move on us.

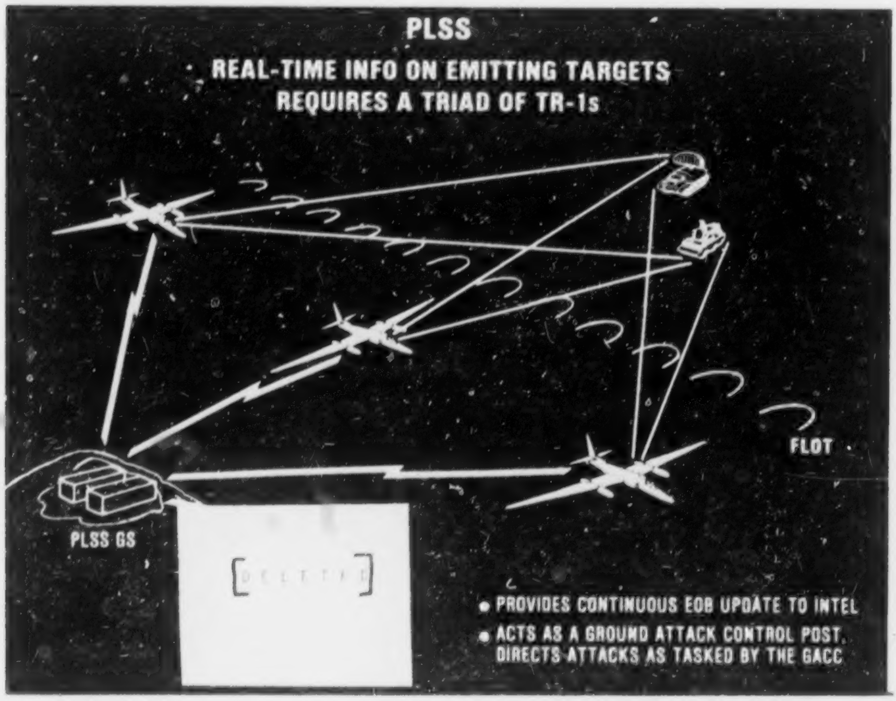
And I would like to spend just a couple of slides on doing that.



ASARS II
HIGH RESOLUTION RADAR IMAGERY
OF FIXED TARGETS
CARRIED BY A SINGLE TR-1

- PROVIDES NEAR REAL TIME PROCESSED/INTERPRETED IMAGERY
- TARGETS MAY BE ATTACKED WITH PLSS OR JOINT STARS CONTROL

Now, the advanced synthetic aperture radar system II, which is a high resolution radar—and I want to emphasize here, that is for fixed targets. That is very important. The ASARS II on this TR-1 is to go against fixed targets. It is tethered to a ground station that puts it then into operations [deleted].



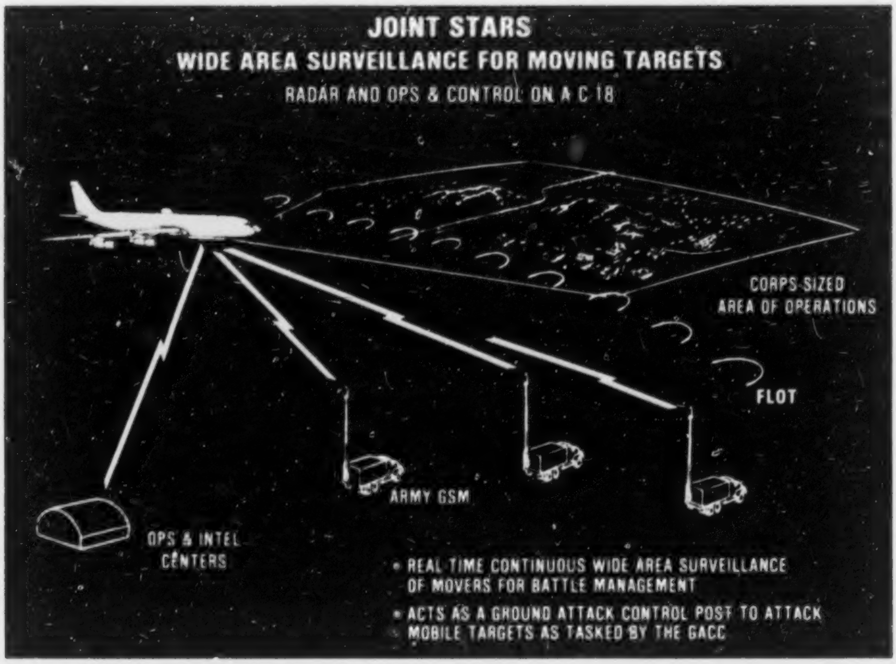
PLSS

- REAL-TIME INFO ON EMITTING TARGETS REQUIRES A TRIAD OF TR-1s

- PROVIDES CONTINUOUS EOB UPDATE TO INTEL
- ACTS AS A GROUND ATTACK CONTROL POST, DIRECTS ATTACKS AS TASKED BY THE GACC

Looking at the second one, then, the precision location strike system, which is aboard the TR-1, also, but it is real time information on emitting targets: [deleted] and such as that, and that is very important. So the first one is on fixed targets; this one is on emitting targets, both that have RF emissions. Again, we tether it to a ground station.

In this case, we have to have three of them for triangulation, simply so that we can be sure we have located it with sufficient accuracy to strike it.



JOINT STARS

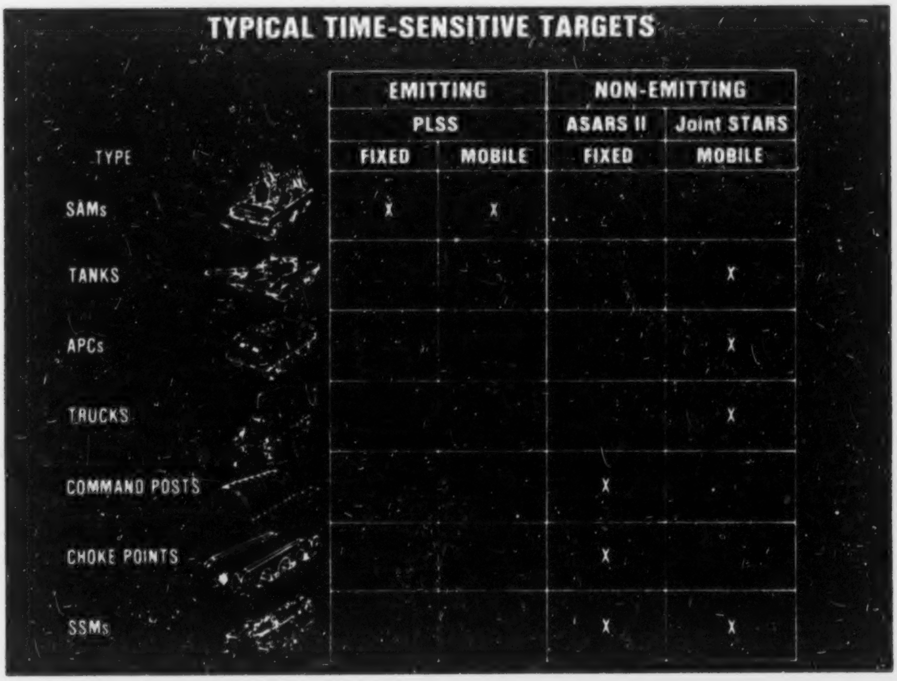
WIDE AREA SURVEILLANCE FOR MOVING TARGETS

RADAR AND OPS & CONTROL ON A C 18

- REAL TIME CONTINUOUS WIDE AREA SURVEILLANCE OF MOVERS FOR BATTLE MANAGEMENT
- ACTS AS A GROUND ATTACK CONTROL POST TO ATTACK MOBILE TARGETS AS TASKED BY THE GACC

The third is Joint STARS, which I just talked about, and this is representing a corps area of [deleted] the line of battle here, the FLOT [the forward line of troops]. And we cover that with this radar system. We cover a whole area every [deleted]. That is important for being able to stay current.

And in this case, we are looking at moving targets. So to put these in perspective, the advanced synthetic aperture radar looks at fixed targets; PLSS looks at emitting targets; and Joint STARS looks at moving targets. So the three of them are mutually supportive, they are complementary, and all three are necessary in order to give us all the information we need to be able to strike our time-sensitive targets.



TYPICAL TIME-SENSITIVE TARGETS

	EMITTING		NON-EMITTING	
	PLSS		ASARS II	Joint STARS
TYPE	FIXED	MOBILE	FIXED	MOBILE
SAMs	X	X		
TANKS				X
APCs				X
TRUCKS				X
COMMAND POSTS			X	
CHOKE POINTS			X	
SSMs			X	X

Looking at this array of targets, you can see that we do cover them with each of the systems. There is some mutual support, but they are not overly duplicative, and we think important to the overall battlefield management picture.

This completes the briefing, Senator. We do have a film if you would like for us to show that, on some munitions.

Chairman GOLDWATER. All right.

Senator GLENN. Mr. Chairman, if I might, I have to go to another meeting, gentlemen. I am very sorry. If I could just ask a couple of questions that you could answer for the record. I do not want to take the time for them right now.

But one, Air Force funding for aircraft replenishment spare parts, has soared since 1980. In 1980, the replenishment spares request was $900 million, in fiscal 1984, it jumped to $3.5 billion. According to GAO, the Air Force's supply availability rate during this same period dropped from 70.4 percent in fiscal 1980 to 54.7 percent in fiscal 1984.

During the same 4-year period of time, the rate of withdrawal of spare parts from war reserve stocks increased by 39 percent, from fiscal 1980 to 1984. Obviously there is some lag in deliveries, but after 4 years, why are cannibalization rates the same as in 1980? Why is the withdrawal rate higher than in 1980? Why is part availability rate down?

What accounts for these discrepancies? And if you can answer that for the record.

Dr. COOPER. Senator, that is a complex question and we would like to respond for the record if we could.

[The information follows:]

REPLENISHMENT SPARE PARTS AND MISSION CAPABLE RATES

Dr. COOPER. Even with full funding of replenishment spare parts, it is unrealistic to assume that cannibalization will not occur. Our objective is to optimize aircraft availability to meet peacetime and wartime objectives which in many cases necessitates management workarounds such as cannibalization. Spares distribution and availability at base level and increased aircraft sortie rates make cannibalization a prudent management action under time constrained pressure situations. Cannibalization rates are not the sole indicator of parts availability or weapon system capability.

In the area of parts availability the Air Force has taken positive management action to decentralize expendable and recoverable spare parts to increase spares stockage at base level. This accounts for the lower supply availability rate as this rate is a function of spares stockage at the aircraft depots not the bases.

The increase in WRM withdrawals is in large part due to a liberalized withdrawal policy at base level since September 1982. This policy has significantly improved the aircraft mission capable rate and increased sortie generation capability.

The mission capable rates for the F-15 and F-16 reached all time highs of 79.8 and 82.4% in the first quarter of fiscal year 1985. These improvements have been mirrored throughout the rest of the inventory. Not Mission Capable Supply time for all of our aircraft has decreased 20% from fiscal year 1981 to fiscal year 1/85. Mission Capable rates are up by 10.7% during the same period. Sortie capability for tactical aircraft since fiscal year 1981 has grown by 76% and Strategic Airlift Capability is up 64% in the same period.

F-20'S IN THE GUARD

Senator GLENN. The other is this idea of the F-20's in the Guard. I know the National Guard Association is promoting the idea of buying the F-20's and putting them in the Air Guard for continental air defense. The Guard Association has stated that the USAF leadership is aware of the National Guard F-20 initiative and has voiced no objections.

Does the Air Force support purchase of the F-20's in order to modernize the Air National Guard?

Dr. COOPER. Can I answer that right now, Senator?

Senator GLENN. Sure.

Dr. COOPER. Very briefly, I have a letter that my boss, the Secretary of the Air Force, wrote to the Guard Bureau. I think the best way to answer your question is: No. 1, there are no funds in our budget to buy F-20's. Mr. Orr says:

> I have instructed my legislative people on the Hill to indicate to any Congresspersons who ask to respond that the Air Force leadership was never asked by the National Guard Association of the United States to comment on its proposal to substitute the F-20 for other programs, and we cannot concur in any implication that it is agreeable to this substitution.

Senator GLENN. That answers my question.

Chairman GOLDWATER. Could I just chip in on that? I spent last Saturday with the Chief of the Air Force and we went through this whole drill. And having been a State commander of the Air National Guard, I can tell you we never confirmed with anybody.

And as you will find out, the way they operate with the Air National Guard and the ground Guard is, the last day of writeup, there are two Members of the Senate that will walk in here with a budget of about a half billion dollars, and included in there is the most interesting budget you have ever heard of.

I have, frankly, as close as I am to the Guard, they have got a reengined C-131 they are talking about and it is quite an airplane. You know, if it flies, everybody wants it.

REMOTE PILOTED VEHICLES (RPV'S)

Senator **Glenn**. There is only one other one I would like to add, to what you are doing on the remote piloted vehicles, the RPV's. We have had dedicated aircraft for this for reconnaissance in the past, and we have—the Navy has gone the route of using some dual capable airplanes, so you put that capability on or it can be on or off, and without dedicating whole aircraft and squadrons just to that one particular purpose.

How much of the effort planned with the funds requested this year will go exclusively for work exploring the possibility of remotely piloted vehicles for use in that mission? If you could furnish that for the record.

Dr. **Cooper**. We will furnish that, sir.

[The information follows:]

Remotely Piloted Vehicles

Senator **Glenn**. How much of the effort planned with the funds requested this year will go exclusively for work exploring the possibility of remotely piloted vehicles for use in this mission? How much of the effort involves projects which cannot be incorporated into an RPV, such as the cockpit simulator in the F-16?

Dr. **Cooper**. Of $20.3M requested, $2.3M is planned to be spent exclusively on unmanned vehicle studies. $3.2M will be spent on cockpit simulation. The remaining funds will be spent on sensor design, ground station design, and flight evaluations. These latter efforts will have approximately 80% applicability to both manned and unmanned air reconnaissance vehicles.

Chairman **Goldwater**. That is a good question. I just read in a technical magazine the day before yesterday that we either have it perfected or close to perfected, an RPV that can identify an enemy ground weapon and attack it.

General **Russ**. Senator, I think we have a good story on that entire process and what we are doing, and we will provide a good insert for the record on that. But just as a bottom line, the Navy and the Air Force have agreed on RPV's as far as reconnaissance and they are working the drone and we are working the sensors. And we think it is proceeding and we are getting it together quite well.

But we will give you a good detailed explanation of how we are doing.

Chairman **Goldwater**. Thank you, John.

Senator **Glenn**. Thank you, Mr. Chairman.

Chairman **Goldwater**. All right, proceed.

Dr. **Cooper**. We have about 10 minutes, Senator. Do you have time for that?

General **Russ**. Before you start, Mac, I would like to make one comment. We understand that there was some discussion the other day at one of the hearings about [deleted]. I wanted to comment on that before this movie because there is a good picture in here of the Maverick going against a cave with steel doors and concrete and all the things. And I think you will see for yourself that it is a pretty tough weapon, with a 125-pound shaped warhead.

All I wanted to say is that we do not necessarily agree with the [deleted].

Just go ahead and run the film.

General **Williams**. Sir, this shows the firing of the AMRAAM missile in 1981. It goes against the QF-102 drone at a distance of [deleted] to the rear and it did work. It did strike the aircraft and did shoot it down at a range of [deleted].

This is a high-speed antiradiation missile, one from an F-4G. This is the initial operational test firings in California's China Lake.

It goes against—it does not have a live warhead, but it goes against the antenna. And I am sure you can appreciate the fact that one, that close, you can see it would have exploded as it passed through the antenna. It hit just behind it.

The next shot is of a GBU-15, which does not have a warhead either. But notice, shortly after launch it begins to climb. This is a low-level laser-guided bomb, LLLGB—no, excuse me, that is a GBU-15 and it goes against a simulated radar tracking van or whatever, and it hits just at the edge of it. And without a warhead, it still damaged to near destruction the tracking van.

The next one is a LLLGB coming off an F-4 here at this point. This is a laser-guided 2,000 pound bomb. I think you might want to note the accuracy here that you can get with a laser-guided bomb. You see a lot of reports about it. This goes against a specific designated target. Note the X there on the board.

Chairman **Goldwater**. Was not that one canceled?

Dr. **Cooper**. Yes, it was, Senator.

General **Williams**. But we are producing approximately 5,000 of them.

Dr. **Cooper**. It was canceled after we produced approximately 5,000.

BOOSTED KINETIC ENERGY PENETRATOR

General **Williams**. This is a static test of a boosted kinetic energy penetrator that is called a BKEP.

General **Russ**. This comes out by parachute and, if you will watch, it blows a hole about [deleted] across and about 6 to 8 feet deep. And it makes a very big movement.

General **Williams**. This is the BKEP. This was done at Eglin. This is our version as it goes against the runway. This is impressive, as it will drive—with a very small warhead, it will drive a crater, [deleted] in diameter with an additional 8 feet of upheaval. You will observe here, you see the runway heave a great deal, which is what we were after. And so about a [deleted] in diameter section that is difficult to repair.

Chairman **Goldwater**. What do you call that one?

General **Williams**. That is a BKEP, a boosted kinetic energy penetrator, B-K-E-P, Senator. That is the acronym.

General **Russ**. We intend to package that, quite a few of those, into different types of shells and use them in our antirunway attacks.

General **Williams**. This is an IR Maverick, Senator, coming off of an A-10, being fired to show how the pilot can fire it and then leave the area, day or night. And he does have good resolution here, going against a tank.

Here are some Gator mines off of an F-111. It is done at China Lake, and they carry 72 antitank and 22 antipersonnel mines in each of those two cannisters. The capability for the antitank mines to produce mobility and firepower kills on a variety of vehicles, and you see them spreading and dispersing there, by design of course.

Chairman GOLDWATER. Yes, I have seen that with the Navy.

General WILLIAMS. Now, here is what it does to the track of a vehicle. And here is another one. And you can see the others in front of the vehicle there around it, giving a high probability of stopping the vehicles as they drive through it.

This is a sensor-fused weapon from Sandia Lab, and you will watch it here. The rocket motor ignites and then begin to turn, dispensing the Skeet warhead. You will see the Skeet warhead operating in a moment. There, that flings them out to the side and you will see it come down and see it moving from the right to the left over the center of the tank. And it senses the tank's engine and ignites its warhead.

This also works against some of the other patch-on armor techniques. But this is an extended range antiarmor munition. This is shown deploying off of an F-16. As the munition dispenser opens you will see nine of them being released.

Dr. COOPER. It is like a robot.

General WILLIAMS. You will see it deploy there and you will see it jump and kick one out, and you will see it jump and kick another one. Each of them contains two warheads.

There is another one. And it does the same here, using the same munition as the earlier one. As a matter of fact, it fires at the engine of the tank as it sails overhead.

Mr. SMITH. What is the status of that program?

General WILLIAMS. Well, we are looking to full-scale development, Mr. Smith.

General RUSS. Testing has been very successful on this.

General WILLIAMS. This is a hypervelocity missile at White Sands. You will notice the silhouette of a tank there. As it goes through, it shows it would have hit the tank by virtue of its accuracy.

It fires at 5,000-feet per second, with a [deleted] foot range. Very effective, multiple kills per pass.

This is a combined effect munition, dropped off of an F-16 at Eglin.

General RUSS. This is one that would be affected by the applique armor that we discussed, because it does not have the power that the other large ones do. But it is still a great weapon against trucks and other vehicles.

General WILLIAMS. These have three kill mechanisms: the shaped charge for armor fragmenting; one for light material and personnel; and incendiary. You will see a ground shot here in a moment. That shows, with the three types of munitions in it, it covers the area very well.

This is an alternate warhead Maverick. We are looking at one out of seven coming off the production line that will have a 300 pound warhead. This shows as it goes through 3 feet of steel-reinforced concrete.

Dr. COOPER. Tremendous momentum.

General WILLIAMS. This is the improved—excuse me. This is another shot of the same. This shot is the one General Russ mentioned, that goes against the cave, a hardened artillery site, with ⅜-inch steel on both sides covering 18 inches of steel-reinforced concrete. Here it blew it out, completely away, and went inside and destroyed a gun.

General RUSS. That is what I meant. I think it will take care of a tank.

General WILLIAMS. And one out of seven off the production line will have the 300 pound warhead.

Now, this is the improved 2,000-pound warhead coming off the sled test. This goes through 4 feet of dirt and 15 feet of steel-reinforced concrete. This is to go against hardened targets, Senator, with a 2,000-pound payload; a very powerful weapon.

The Harpoon, I believe you have seen some information on that, launched off a B-52 here. That has about a [deleted]. It can skim down to around [deleted] the ocean or the top of the water. And here it goes against a surface ship and does a very good job.

The next shot is 30 millimeter firing from an A-10 against a tank.

And that completes the film, sir.

Chairman GOLDWATER. That was very interesting.

General WILLIAMS. This concludes the formal portion of the briefing, sir. Thank you.

Chairman GOLDWATER. Well, thank you, gentlemen. That was a very fine briefing. And do any of the staff members have questions?

[No response.]

Dr. COOPER. That is a courtesy to one of their former staff colleagues, Mr. Chairman. They will not ask any dirty questions at this point.

Chairman GOLDWATER. Well, they are pretty good about it, and I do thank you.

As you know, we have some real problems, and I don't want to sit here and sound pessimistic, but when we are told to knock $18 billion out of our budget, we know that is just to start. As I told the Navy last week, and I will just mention it to you, you might be figuring out what you can get along without the best because we may get to that point.

Dr. COOPER. I understand.

Chairman GOLDWATER: I hope we can change the minds of the committee. As you realize, we only have one new item in the so-called budget, and that is $40 million for an Army-Air Force communications system. All the rest of the money we owe.

I think we are going to make some changes.

I have a number of questions from the members of the committee to be answered for the hearing record.

[Questions with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR STROM THURMOND

NEEDS OF OUR UNIFIED COMMANDS

Senator THURMOND. The Air Force has come a long way from the late 1970s when airplanes had to be constantly cannibalized to keep other planes flying, and I hope that we never return to such a situation. Unfortunately, Mr. Chairman, we must face some difficult decisions if we are to meet the Defense spending goals presently set by the Budget Committee, and none of the options look good. Some programs may have to be canceled or severely curtailed, and it is important that the services give us their best advice on what can be reduced or eliminated.

General Russ, when the commanders of the unified commands testified before this committee, several of these commanders brought up the subject of special operations forces. Adequate infiltration and exfiltration aircraft are not available to fulfill mission requirements, yet I notice that you only ask for one combat talon aircraft in the budget. Is this an economical buy and are you addressing the needs of our unified commands in this area?

General RUSS. We are continuing the same level of effort as approved in previous budgets, and although the budget reflects only one aircraft, we are actually going to get two Talons. To avoid unnecessary procurement funding, we will input a demodified C-130, formerly a Credible Sport aircraft, into the production line.

Our total planned Talon procurement is 21 aircraft (including the modified Credible Sport C-130). Fiscal constraints and other Air Force requirements necessitate the current buy profile. Military Airlift Command continues to train specially qualified tactical airlift crews in special operations procedures in order to meet the unified commanders needs. All special operations requirements will eventually be satisfied by the completion of the Talon program and the procurement of CV-22 (JVX).

COMBAT TALON

Senator THURMOND. General Rogers has stated that he will [deleted]. Other commanders have the same missions. The production line for the C-130 is coming slowly to a halt. In fact the manufacturer is presently making plans for which he has no purchasers. This sort of production profile will only drive the cost of each Combat Talon up. General Russ, would it not be more prudent to increase the number of these aircraft purchased each year in an effort to avoid much higher costs?

General RUSS. We share your concern in avoiding higher costs for the MC-130H program. The Combat Talon program office is currently negotiating with Lockheed for a firm-fixed price option throughout the remainder of the program. This type of contract will achieve cost stability and promote corporate design commitment throughout the procurement years. The contract will specify a single C-130 configuration thereby eliminating the primary cause for cost increases.

QUESTIONS SUBMITTED BY SENATOR JOHN WARNER

PROTECTION OF AMERICAN AIRCRAFT

Senator WARNER: Recently, the Air Force's guiding operation doctrine "Air Force 2000" has been criticized because most of the maintenance and repair networks required to keep the fighters flying in Europe are potentially vulnerable. How are the allies and the United States going to protect American aircraft deployed in a crisis in Europe?

Dr. COOPER: Presently, there are over 1,480 allied aircraft shelters in Europe. The United States has a need for nearly 2000 aircraft shelters in Europe for both inplace and additive forces. Presently, we have 921 aircraft shelters of which 637 are at main operating bases and 284 are at collocated operating bases for deploying US forces. Recent planned budget increases in the NATO Infrastructure funding should provide monies for an additional 530 US aircraft shelters over the next six years. In the interim, the Air Force has programmed moveable concrete revetments which provide limited splinter protection for unsheltered aircraft until a sufficient number of shelters are constructed.

As for protecting critical maintenance and repair facilities, only avionics maintenance facilities are included under NATO Infrastructure funding for semi-hardened facilities. Because of the prohibitive cost of constructing new semi-hardened facilities to replace existing soft critical maintenance and repair facilities, the Air Force has programmed moveable concrete revetments to provide limited protection at main operating bases (MOBs) and collocated operating bases (COBs).

For both US aircraft and facility revetments at COBs, the Air Force intends to buy the materials and supplies while the host nation provides site preparation, installation, and follow-on maintenance.

TACTICAL FIGHTER WINGS

Senator WARNER: The Air Force plans to fully equip forty tactical fighter wings with seventy-two combat ready aircraft each. What are the personnel requirements associated with this capability? Do you have sufficient personnel on active duty and in the reserves?

Dr. COOPER: The Air Force program to reach 40 tactical fighter wings requires an additional 2400 active duty and 4700 reserve personnel. This manpower is in addition to the FY 86 President's Budget and represents a growth over the Air Force's current available personnel strength.

COMMONALITY IN THE JTACMS PROGRAM

Senator WARNER. How is commonality going to be ensured between the Air Force and Army in the complementary Joint Tactical Missile System (JTACMS) Program?

Dr. COOPER. The Air Force and Army have signed two documents agreeing to ensure that their JTACMS programs will be fully complementary. The Joint Statement on Need for The Joint Tactical Missile System (JTACMS), signed by Air Force Deputy Chief of Staff Plans & Operations and Army Deputy Chief of Staff Operations & Plans on 26 Nov 84, implements guidance from the Service Chiefs' Joint Force Development Agreement. Army Deputy Chief of Staff Research Development & Acquisition and Air Force Deputy Chief of Staff Research Development & Acquisition also signed a Memorandum of Agreement on Joint Tactical Missile System Development and Acquisition on 27 Nov 84. The Air Force and Army JTACMS programs will be guided by these agreements to ensure that the Service contributions to the complementary family of weapons are not duplicating capabilities.

QUESTIONS SUBMITTED BY SENATOR PETE WILSON

FUNDS FOR F-20'S

Senator WILSON. General Russ, in your opinion, what uses do you see for and what benefits would be derived from Congress adding funds for F-20s for the Air National Guard?

General RUSS. The Air Force continues to study the feasibility of using the F-20 in a variety of fighter and attack missions in both the Active and Reserve forces. At this time we feel there are greater benefits to be derived from pursuing the fighter procurement strategy requested in this budget and outlined in the Fighter Roadmap. An integral objective of that strategy is to minimize the number of fighter production lines and to achieve economic production rates on those lines while obtaining the most capable aircraft. Additional long term savings will be realized through this strategy by minimizing the type of aircraft in our operational inventory with resultant efficiencies in such areas as logistic support, training and tactics development.

PART OF F-20 IN MODERNIZATION

Senator WILSON. In your opinion, what would the F-20 do to help modernization?

General RUSS. Introduction of F-20s, above the planned fighter procurement rate would help prevent aging of the overall fighter force. Air Force plans for force modernization, however, must consider more than just age. They must also consider the requirement for the proper mix of capabilities and the quality of the force. Our fighter procurement strategy, which does not now include the F-20, is continually under review to insure that we achieve the proper mix and quality as well as the proper force size with an acceptable age. Consideration of potential contributions of the F-20 to our force goals is a part of that review.

NEED FOR F-20

Senator WILSON. In your opinion, is the F-20 needed?

General RUSS. The need for any fighter aircraft is based on operational requirements. It is our current judgement that our requirements will be best met through execution of our fighter procurement strategy as outlined in the Tactical Fighter Roadmap and reflected in our budget request.

F-20

Senator **Wilson**. In your opinion, would it enhance the Air Force and Air Guard inventory?

General **Russ**. The F-20 is proving to be a first rate fighter aircraft with potential to provide a positive contribution to the total force inventory. For this reason, even though it's introduction into the force is not contemplated at present, it has and will continue to receive consideration as we review our fighter requirements and procurement strategy.

Questions Submitted by Senator Carl Levin

F-4 AND RF-4 AVIONICS

Senator **Levin**. Do you have any plans to modify or upgrade the avionics of the remaining F-4 and RF-4 aircraft in the reserve and regular Air Force? If so, how many aircraft will be involved? How much do you anticipate this will cost?

Dr. **Cooper**. Yes, we plan on several avionics modifications. They are APS-107 Radar Warning Receiver (RWR) replacement, Parkhill secure voice, Mark XII Identification Friend or Foe (IFF) improvements, Wild Weasel performance update, Have Quick radio, RF-4 radar update and inertial navigation system (INS). Although each F-4 will not receive all modifications, all F-4s will be involved with one modification or another. The total costs we have programmed (FY86-FY90) for these modifications are $903 million. The Wild Weasel performance update accounts for $526 million of this total.

F-4 AVIONICS MODIFICATIONS IN FISCAL YEAR 1987

Senator **Levin**. How much money will you be requesting for F-4 avionics modifications in fiscal year 1987?

Dr. **Cooper**. The programmed funding for fiscal year 1987 includes $325 million for these F-4 avionics modifications. Of this, the Wild Weasel performance update accounts for $212 million.

FUNDING FOR F-4 AVIONICS

Senator **Levin**. Do you anticipate requesting additional funding for F-4 avionics upgrade as a part of the fiscal year 1985 supplemental request?

Dr. **Cooper**. No. We do not anticipate requesting additional funds.

RETIRING OF THE F-4/RF-4 FLEET

Senator **Levin**. When do you anticipate retiring the last of the F-4/RF-4 fleet from the regular force to the reserve forces? How many aircraft will be involved?

Dr. **Cooper**. Our force structure planning, which extends throughout 1993, carries F-4s in the regular force through the foreseeable future.

RF-4C AIRCRAFT

Senator **Levin**. In 1984 the Congress authorized and appropriated $16 million for upgrading the digital navigation system of 40 ANG RF-4C aircraft. Is this money sufficient to complete this task?

General **Conaway**. We do not know at this time; however, the source selection process has begun. We hope to be on contract by 1 Aug 85. At that time exact cost data will be available.

Senator **Levin**: Mr. Chairman, last week I submitted a number of questions on behalf of Senator Leahy that relate to funding for the National Guard and Reserves. Today I would like to submit two additional questions from Senator Leahy that concern the Air National Guard. As I mentioned last week, I believe it is important that these questions are answered to see whether the problems he has identified are specific to Vermont, or exist nationwide.

I therefore ask unanimous consent that I be permitted to submit these questions for the record on behalf of Senator Leahy and to be answered by the Director of the National Guard Bureau and the Chief of the Air National Guard.

Questions Submitted by Senator Patrick J. Leahy

M-60 MACHINE GUNS, MORTARS, AND ROCKET LAUNCHERS

Senator **Leahy**. During a visit to Vermont Air National Guard facilities, I learned that the availability of M-60 machine guns, mortars and rocket launchers make it impossible for security units to train under realistic conditions to defend airbases from ground attack during combat operations or from terrorist incidents. Forward basing of air units in a NATO conflict would expose these units to ground attack without means of defense. Is the Department of Defense considering requirements for defense of airbases under such conditions and for effective training of base security units in the Reserve Components? When will adequate numbers of M-60 machine guns, mortars and rocket launchers be allocated to appropriate Air National Guard units for training purposes? What would be the funding requirements to meet at least minimum training needs for such purposes in the Air National Guard nationwide? To meet full operational requirements?

Dr. **Cooper**. The Department of the Air Force has developed requirements for defense of overseas airbases against ground attack and terrorist incidents. Weapons to accomplish this mission include M-60 machine guns, M-203 grenade launchers, MK-19 grenade machine guns, 50 caliber machine guns, 90MM recoiless rifles and 81MM mortars. Mobility tasked security police units in the Air Reserve Components require M-60 machine guns and M-203 grenade launchers. Air National Guard mobility tasked security police units are required to train members of the unit in the effective employment of the M-60 machine gun, M-203 grenade launcher and tactics associated with defense of airbases. The active Air Force currently provides heavy weapons teams equipped with MK-19 grenade machine guns, 50 caliber machine guns, 90MM recoiless rifles and 81MM mortars required to defend overseas airbases. The total number of M-60 machine guns and M-203 grenade launchers required by Air National Guard nationwide to equip mobility tasked security units will be procured this fiscal year at a cost of approximately $600,000 and units should receive the items in late calendar year 1985 or early in 1986. Except for qualification and tactical employment of M-60 machine guns and M-203 grenade launchers, Air National Guard mobility tasked security units have received training associated with defense of overseas airbases.

PILOT TRAINING

Senator **Leahy**. Current regulations from the USAF prohibit age waivers for navigators and weapon system operators to attend pilot training. As a consequence, Air National Guard units facing conversions from dual to single seated aircraft face immediate losses of many highly skilled Navigator Systems and Weapons Operations Officers. This could result in a marked decline in combat readiness. What is the rational for denying selected aircrew members the opportunity to attend pilot training? What changes to current regulations would be required to eliminate the current prohibition on age waivers for pilot training?

Dr. **Cooper**. Air Force Regulation 51-4 specifies a maximum age for flying training entry, but it does not prohibit age waivers. The age limitation for entry into pilot training is based on a combination of factors which address personnel management, flying officer utilization, amortization of training costs, medical considerations and safety. Previous studies and history show that older pilot trainees have a tendency to attrit from flight training at a greater rate than younger trainees. Our experience also indicates that older pilots incur an increase in medical problems resulting in removal from flying status. In addition, we currently receive many more applications from fully qualified applicants than we have pilot training quotas. Thus to insure flying safety, to obtain an adequate return on flying officer training, and to reduce training costs, the Air Force selects only the best qualified applicants.

The maximum age policy has proven very effective in producing pilots from our training programs with minimum elimination rates and maximum payback potential. Since there is no prohibition on age waivers for pilot training, no change to the regulation is necessary.

Questions Submitted by Senator Jeff Bingaman

PROBLEMS WITH AMRAAM

Senator **Bingaman**. Given the cost problems with AMRAAM, why not wait a year for the uncertainties to be resolved?

Dr. **Cooper**. It will not be necessary to wait a year to resolve uncertainties. Current OSD direction is expected to result in a program resolution by early summer 1985. Following the 23 Jan 85 AMRAAM program review, the Deputy Secretary of Defense directed the Air Force to establish a multi-service/ OSD cost reduction committee to evaluate alternative methods for reducing AMRAAM production costs. The committee is currently assessing all cost-driving elements of the AMRAAM program to identify program changes that can realistically be expected to yield savings in total program costs. The Deputy Secretary of Defense has directed that all AMRAAM production decisions be deferred until the Air Force can show that production costs have been contained. The Secretary of Defense will be monitoring progress on these cost reduction exercises monthly. His decision on allowing AMRAAM production to proceed will be contingent on effective cost control measures and the need for AMRAAM missile capabilities.

INVENTORY OBJECTIVES FOR AMRAAM

Senator **Bingaman**. Have we changed our inventory objectives for AMRAAM since we learned that it will cost twice our original estimate? If the Air Force has not reduced its objective, have they made compensating changes in other accounts so there is room in the budget to finance the same number of missiles at twice the projected cost?

Dr. **Cooper**. The total AMRAAM procurement quantity has remained unchanged since it was established at the Sep 82 DSARC II for full scale development. Since that time, program cost estimates have been refined and the procurement schedule has been rephased to take into account fact-of-life program changes. The budget has been adjusted accordingly during the normal budget formulation process. Therefore, the current budget will finance the same number of missiles even though the projected cost has gone up. However, there are two activities underway that may affect this situation. The Air Force is continuing to study the overall air-to-air missile requirement to determine the optimum mix of AIM-7 Sparrows, AIM-9 Sidewinders, and AMRAAMs. Once this effort is completed, the inventory objectives for these missiles may change, in which case the procurement quantities may change as well. At the direction of the Deputy Secretary of Defense, a multi-service/OSD committee chaired by the Assistant Secretary of the Air Force for Research, Development and Logistics is evaluating alternative methods for reducing AMRAAM production costs. Based on the results of this study and the military need for the missile, the Secretary of Defense will make a decision on allowing AMRAAM to proceed into production. This decision may also change the production quantity and budget. As stated by Secretary Orr in his 31 January 85 letter to Senator Goldwater, the Air Force will report back to Congress when the committee's actions are complete and a decision has been made.

TERMINATION OF AMRAAN

Senator **Bingaman**. If the Secretary decides to terminate AMRAAM, what alternatives are available? (Undoubtedly the answer will be "it will cost more to go with an alternative than to stay with AMRAAM". The question is what practical considerations are available if AMRAAM is terminated.)

Dr. **Cooper**. The process necessary to answer this question is currently underway. Following the January 23, 1985 AMRAAM program review, the Deputy Secretary of Defense directed the Air Force to establish a multi-service/OSD cost reduction committee to evaluate alternative methods for reducing AMRAAM production costs. This committee is currently assessing whether the operational requirement being addressed by AMRAAM can be met at less cost by procuring other weapons to replace or supplement AMRAAM. The results of this committee's actions will be reported by the Secretary of the Air Force to the Secretary of Defense in June 1985. In a 31 Jan 85 letter to Sen Goldwater, Secretary Orr committed to report back to Congress when the committee's findings are complete.

COMMONALITY IN AVIONICS

Senator **Bingaman**. The Navy has an explicit policy to attain 90 percent commonality in avionics and electronics for the F-14, F/A-18, A-6 and AV-8B. According to Navy estimates this will save over $4 billion just through the end of this decade. Does the Air Force have a similar policy for common avionics and electronics?

Dr. **Cooper**. The Air Force does not have a specific policy to achieve 90% commonality of avionics and electronics used in its aircraft. Extensive commonality of avionics and electronics does, however, exist in Air Force aircraft, especially in communications, navigation, identification and flight control subsystems. Changes in mission requirement, the enemy threat, and technology may preclude using existing avionics and electronics on new aircraft.

The approach employed by the Air Force is structured to consider many impacting considerations, while maintaining the objective to provide the avionics capabilities required by our different aircraft. The Avionics Control activity at the Aeronautical Systems Division is tasked to identify standardization opportunities. Their approach is to evaluate new and replacement avionics requirements of like or similar functions and to harmonize and partition those requirements and functions to achieve the widest application across different aircraft. Factored into their assessments are considerations such as cost, competition, quantity, compatability, commonality, technology transparency, industrial base requirements and support requirements. They employ Life Cycle Cost techniques to assess the cost-effectiveness of using common versus unique equipment. Through the Joint Services Review Committee for avionics, the Avionics Control activity works with the other Services to identify avionics systems that can be used in each others aircraft. Therefore, the thrust of this approach is to make the optimum use of DOD as well as Air Force avionics resources.

COMMONALITY IN AVIONICS AND ELECTRONICS FOR THE F-15, THE F-15E AND THE F-16

Senator **Bingaman**. What is the present extent of commonality in avionics and electronics for the F-15, the F-15E, and the F-16?

Dr. **Cooper**. Seventy-seven percent of the F-15E line replaceable units (LRUs) have common hardware with F-15C/D LRUs. However, software changes to some of these LRUs are required to meet unique F-15E mission requirements. Design mission requirements, size, and development dates associated with the F-15 and F-16 resulted in significant differences in avionics and electronics. There is very little commonality between the F-15 and F-16 except for some minor subsystems such as radios, the Identification Friend or Foe (IFF) system transponder, and the radar altimeter on the F-15E.

COMMONALITY OF AVIONICS BETWEEN PRODUCTION AIRCRAFT AND ATF

Senator **Bingaman**. Is it possible to attain 90% commonality of avionics and electronics between existing production aircraft and the new Advanced Tactical Fighter on the drawing boards? How much commonality is likely? How much is desirable? How much might this lower the development cost for this new aircraft?

Dr. **Cooper**. Avionics subsystems currently installed in F-15 and F-16 production aircraft employ avionics architecture defined in the late 1960s and electronics technology developed in the early 1970s. Propogating this limited and aging architecture into the Advanced Tactical Fighter (ATF) would preclude integrating subsystems for enhanced capability, availability and survivability in combat. Further, the Air Force would be unable to take advantage of the competitive forces in industry which have dramatically reduced the cost of digital equipment. The Air Force strategy, rather, is to employ ATF avionics architecture in retrofits and future production F-15 and F-16 aircraft where practical.

The ATF avionics architecture, named Pave Pillar, was developed from 1981 to 1983. This avionics architecture will consist of very high speed integrated circuit (VHSIC) standard modules interconnected by fiber optics data busses. The Pave Sprinter program will implement this Pave Pillar architecture for retrofit/future production F-15/F-16 aircraft in parallel with the on going Pave Pillar avionics development for the ATF. Thus, the building blocks for improved systems on existing aircraft and new systems for the ATF will be the same. The Integrated Communication Navigation Identification Avionics (ICNIA) subsystem will be the first system employing this new architecture to reach production and it will go in both F-15/F-16 aircraft and the ATF. Other modular systems will be developed and produced as the threat and electronics technology makes earlier systems obsolete or uneconomical to support.

It is both impractical and undesirable to attain 90% commonality of existing production aircraft avionics with the ATF. It is likely that in the 1990s, F-15 and F-16 aircraft will have 10-15% avionics commonality with the ATF through retrofit/forward fit of ATF avionics into these older aircraft. This commonality could rise to 25-30% by the year 2000 as older aircraft are retrofitted with standard modular avionics.

It is desirable to have as much hardware commonality as practical as long as mission effectiveness and survivability are not compromised. Decisions to retrofit older aircraft will be made relative to world situation, cost, benefits, and plans for airframe retirement.

This commonality will lower the development risk and, hence, help schedule but will not appreciably reduce development cost. If commonality in the 15-20% range is achieved, however, overall ATF production costs might possibly be reduced 3-7% across the projected production run. However, there should be a significant reduction of the life cycle cost of an ATF containing modular avionics due to increased reliability, availability and maintainability and reduced spares cost thru competitive procurement of replacement modules.

QUESTIONS SUBMITTED BY SENATOR JOHN GLENN

PRODUCTION FACILITIZATION RATE FOR C-17

Senator GLENN. What production rate capacity is programmed for the C-17? What rate of production is provided by the facilities included in the Air Force's budget for the C-17?

Dr. COOPER. The production rate capacity programmed for the C-17 is 25 aircraft per year. Budgeting at this rate begins in fiscal year 1992 and deliveries of 2 per month are reached in October 1993.

There is no funding in the Air Force's budget for facilities at the C-17 plant. Plant capacity could be increased to 36 aircraft per year with additional tooling and personnel.

ADVANCED TACTICAL FIGHTER AFFORDABILITY

Senator GLENN. The Air Force has stated that "a new generation of fighters will be needed in the early 1990s to keep pace with threat improvements and expanding mission needs and to achieve greater efficiency in overall systems operations." How important is "affordability" in the Air Force's planning guidelines for the Advanced Tactical Fighter? What affordability goals have been established for the Advanced Tactical Fighter?

Dr. COOPER. As addressed in the Advanced Tactical Fighter (ATF) Statement of Need (SON), dated Nov. 9, 1984, affordability is primary in managing the ATF development. The SON clearly states that tradeoffs will be necessary between performance and total life cycle costs in order to allow procurement and support in the quantities necessary to address the threat. Furthermore affordability is addressed as a design challenge with specific affordability goals established. Takeoff gross weight is a fundamental cost driver and the SON has established a goal of 50,000 lbs (full internal fuel, 4 radar missiles, 4 infrared missiles and gun). ATF affordability is considered of primary importance and the program is being actively managed from top down to hold the ATF within the stated goals.

F-15 UPGRADE

Senator GLENN. How much more expensive can the ATF become before the Air Force believes it is more cost-effective to upgrade the F-15? Can the F-15 be fitted with the Joint Advanced Fighter Engine that is being developed in conjunction with the Advanced Tactical Fighter?

Dr. COOPER. The ATF blends enhanced supersonic performance, improved supportability, and survivability features in an innovative air superiority design. The projected threat in the 1990s, with a look-down/shoot-down capability, will require the ATF to conduct air superiority missions over enemy territory. Although planned improvements will extend the F-15s viability through the 1990s, inherent airframe limitations make it impossible to improve the F-15 to meet ATF mission requirements. In addition, the next generation of Soviet fighters and follow-on versions will continue to erode the air-to-air superiority the F-15 enjoys against current Soviet fighters.

The Joint Advanced Fighter Engine (JAFE) is a technology demonstration program being accomplished to reduce risk for the later full scale development of an advanced engine for the ATF. The JAFE engines will be optimized for the supersonic flight regime where the F-15 airframe is aerodynamically inefficient and would be impractical for retrofit.

LIMITATION OF THE F-15

Senator GLENN. What are the most important limitations of the F-15 in dealing with the projected threat of the early 1990s?

Dr. **Cooper**: The F-15 has possessed an advantage over Soviet fighters for more than a decade, but this advantage will deteriorate as the Soviets field new generation aircraft. [Deleted.] The Flanker is a heavier air superiority fighter designed for offensive operations over friendly territory and will have [deleted]. The Soviets have invested heavily in [deleted].

As a result of these improvements in current and projected threat systems, the F-15 will require increased capability in maneuvering performance, avionics and air-to-air munitions. Examples of programs to achieve these improvements include: Increased thrust engines, air-to-air radars with improved Electronic Counter Counter-Measures, and advanced air-to-air munitions (AMRAAM/ASRAAM).

RETROFIT ON THE F-15 AND F-16

Senator **Glenn**. How much of the research and development activity that will be financed by this year's budget request is applicable for retrofit on the F-15 and F-16 aircraft?

Dr. **Cooper**. RDT&E funds are used for retrofit kit development only if the modifications are not incorporated in production aircraft. F-15 retrofit plans do not include systems in this category except for ASAT, which has its own R&D program. The F-16 A/B Operational Capability Upgrade (OCU) program does require RDT&E funding since this modification does not go on production aircraft. Of the research and development funds budgeted for the F-15 and F-16 in fiscal year 1986, the following are applicable to retrofit efforts:

[Dollars in millions]

F-15 (PE 27130F)	0.0
F-16 (PE 27133F)	25.1

There is also $2.0M budgeted in fiscal year 1986 under PE 64406F for Research and Development activities associated with the ASAT modification for selected F-15 aircraft.

AVERAGE ANNUAL PRODUCTION RATE FOR THE ATF

Senator **Glenn**. The Air Force System Command's study entitled "Affordable Acquisition Approach" concluded that the production rate on fighters has decreased, on the average, by 20% per decade. From 1982 to 1992, the average F-15 production rate will be 48 per year, if you get your full budget request in these years which is unlikely. A 20% reduction would result in an average of 38 aircraft per year in the 1990s when the ATF begins production. Is fighter modernization at all possible with a production rate at that level? What must be the average annual production rate for the ATF in order to meet the Air Force's modernization goals and retain the current average age in the tactical Air Force?

Dr. **Cooper**. Air Force tactical modernization goals can be met by total annual procurement of 260 to 280 fighter aircraft of the proper mix and capabilities. ATF procurement will be a portion of this total in the 1990s. However, at this time exact rates have not been determined. When determined, they will reflect a proper balance of ATF procurement within overall tactical fighter modernization requirements.

REPLACEMENT OF A-7 AND A-10

Senator **Glenn**. What is the Air Force currently doing in the near term to replace the A-7 and in the long term to provide a follow-on to the A-10 for Close Combat Support?

Dr. **Cooper**. The Tactical Air Command (TAC) is developing a Statement of Need (SON) which outlines the requirements for a close air support aircraft (A-X) to replace the A-7 in the near term and the A-10 in the long term. The SON is being coordinated with the Air Staff, Army Staff, and Major Commands. The Air Force is also developing a request for Information (RFI) concerning candidate aircraft for the A-X mission. The Air Force expects to issue a Request For Proposal (RFP) following assessment of industry response to the RFI.

MISSION ELEMENT NEED STATEMENT FOR NEW CLOSE COMBAT SUPPORT ACTIVITY

Senator **Glenn**. Has a Mission Element Need Statement been approved by the Defense Resources Board for a new close combat support aircraft?

Dr. **Cooper**. The Justification for Major System New Start (JMSNS), which is the vehicle used for introduction of a new weapons systems within DOD, is currently in the coordination process at the Air Staff level. Upon completion of coordination, the JMSNS will be submitted for inclusion in the 87 POM for subsequent OSD approval.

FOLLOW-ON CLOSE AIR SUPPORT AIRCRAFT FOR THE A-7

Senator GLENN. The average age at present of the A-7s is 13 years. It is now taking 12-15 years to develop a new aircraft. What is the Air Force doing to develop a follow-on close air support aircraft for the A-7s?

Dr. COOPER. The Air Force is preparing a statement of need to support procurement of a Follow-On Close Air Support (CAS) aircraft. The Air Force envisions that the Follow-On CAS aircraft will be a missionized version of an existing aircraft in order to reduce development time and costs.

FOLLOW-ON AIRCRAFT FOR THE A-10

Senator GLENN. There will be a 13-14 year gap between the time a Mission Element Need Statement and IOC for the Advanced Tactical Fighter. If there is a comparable gap for the A-10 follow on, what will be the average age of the A-10 fleet at the time of IOC?

Dr. COOPER. The Justification for Major System New Start (which replaced the Mission Element Need Statement) for a Follow-On Close Air Support (CAS) aircraft will be forwarded for approval this year. Initial procurement would occur near the end of the 1980s. The reason procurement can occur at this early date is because the Air Force does not intend to develop a completely new aircraft. Instead the plan is to modify an aircraft that has already been developed. This aircraft is planned to replace the aging A-7 aircraft initially and, subsequently, the A-10. By 1990 the average age of the A-7 will be 17 years and the A-10 average age 9.5 years.

DEDICATED AIRCRAFT FOR RECONNAISSANCE

Senator GLENN. The Air Force has stated that it is exploring the use of both manned and unmanned vehicles for the Advanced Tactical Air Reconnaissance System. The ATARS program will develop a follow on to the current dedicated reconnaissance version RF-4s. Currently the Air Force has 13 RF-4 squadrons and would like to retain that force structure as the RF-4s reach the end of their service life.

Can we afford dedicated aircraft for reconnaissance in the future, or will the Air Force follow the route taken by the Navy with a reconnaissance capability installed on an F-14 or F-18 without removing the aircraft from the fighter force structure?

Dr. COOPER. The ATARS program is designing a reconnaissance pod which will be carried on tactical fighter aircraft. The aircraft would retain its fighter capabilities. While the Air Force has no plans to build a fighter-type aircraft that has only reconnaissance capabilities, the Air Force has not yet determined the structure of the future reconnaissance force.

As part of the ATARS program, the Air Force is addressing several issues, including: the capability of a single crew member to accomplish the reconnaissance mission, the requirement for a two-man aircraft with a missionized rear cockpit, the training requirements for a dual role (fighter and reconnaissance) aircraft crew member, and the distribution and deployment of reconnaissance assets in the force structure. The resolution of these questions will provide a basis for determining the overall tactical reconnaissance force structure.

INFLIGHT IMAGERY REVIEW

Senator GLENN. How much of the R&D funding planning for ATARS over the next 5 years is dedicated at this stage to all aspects of evaluating the possibility for "inflight imagery review" in a manned vehicle?

Dr. COOPER. The evaluation of the possibility for "inflight imagery review" will take place in fiscal year 1986. Of $20.3M of R&D funds planned for ATARS during fiscal year 1986, $3.2M is planned to be spent on simulation which, in addition to evaluating the possibility for "inflight imagery review", will include an investigation of whether the reconnaissance mission can be flown by a single crew member; what the optimum cockpit layout should be; crew coordination duties; and design of simulator training courses.

F-20'S IN THE NATIONAL GUARD

Senator GLENN. The National Guard Association is promoting the idea of buying the F-20 and putting them in the Air National Guard for Continental Air Defense.

The National Guard Association has stated "the USAF leadership is aware of the NGAUS F-20A initiative and has voiced no objections." Does the Air Force support purchase of the F-20 in order to modernize the Air National Guard?

Dr. COOPER. As outlined in the USAF Fighter Roadmap, the USAF plans to modernize the Tactical Air Forces (TAF) with F-15 and F-16 aircraft specifically designed to meet worldwide requirements. The USAF does not support purchase of F-20s in place of F15s or F-16s to modernize the Air National Guard. Since the Air Force does not currently plan to procure the F-20 for the Active Force, equipping the Guard with the aircraft would mean operating it solely in the Guard. The USAF prefers not to do this, for several reasons. First, past experience, particularly with the A-7D, F-4C, and F-4D, has shown that support is more difficult and expensive when the Guard operates a model aircraft not simultaneously operated by the Active Force. This is due to the unique supply channels required, among other things. In addition, the Guard recruits heavily from the active manpower pool. Guard units operating aircraft not operated in the Active Force face a limited pool of current experience to draw on. As a result, these Guard units are forced to perform more training, increasing costs. Finally, Guard units operating aircraft also found in the Active Force benefit from tactical developments and improvements generated by the Active Force. Guard units with no Active Force counterparts must do most of their own tactics development and improvement. This places additional demands on these units. It also serves as a barrier to development and maintenance of a common tactics base between these Guard units and Active Force units, requiring additional efforts to integrate these Guard units into Total Force plans and operations.

In summary, the Air Force supports the procurement program of F-15 and F-16 aircraft as outlined in the Tactical Fighter Roadmap and expressed in the fiscal year 1986 President's Budget. This best meets the worldwide mission requirements of the Tactical Air Forces.

SPARROW MISSILES ON THE F-16

Senator GLENN. Press reports indicated that last week an F-20 launched a Sparrow missile and destroyed a drone target. Is it possible to install Sparrow Missiles on the F-16? Would the Air Force favor that course, at least for older generation F-16s that are scheduled to be transferred some day to the National Guard?

Dr. COOPER. Yes, it is possible to install the AIM-7 (Sparrow) missile on the F-16 if required hardware and software changes are made to the aircraft. The Air Force believes that providing AIMcapability on F-16A/Bs currently programmed for National Guard strategic defense forces is a prudent course of action. However, the decision has not been made and will be discussed this summer in conjunction with the fiscal year 1987 Budget deliberations.

Chairman GOLDWATER. I do want to thank you gentlemen. It has been a very interesting presentation, and you probably will be hearing from us again.

Mr. COOPER. Senator, let me just say that it is always a treat to come here, and really an honor for us, and appear before you. You have been very, very supportive, and we appreciate that.

Chairman GOLDWATER. It is no trouble.

The meeting is adjourned.

[Whereupon, at 11:53 o'clock a.m., the subcommittee recessed subject to the call of the Chair.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1986

THURSDAY, MARCH 14, 1985

U.S. SENATE,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

JOINT COMMUNICATIONS/ELECTRONIC WARFARE

The committee met in executive session, pursuant to notice, at 9:13 a.m., in room SR-222, Russell Senate Office Building, Senator Barry Goldwater (chairman) presiding.

Present: Senators Goldwater, Thurmond, Warner, Cohen, Denton, Bingaman, Dixon, and Glenn.

Staff present: Carl M. Smith, George K. Johnson, Jr., and John J. Hamre, professional staff members; and Inga B. Schoonover, staff assistant.

Also present: Gerald J. Smith, assistant to Senator Goldwater; Phil Upschulte, assistant to Senator Glenn; James H. Dykstra and Dale F. Gerry, assistants to Senator Cohen; Edward McGaffigan, Jr., assistant to Senator Bingaman; Charles C. Smith, assistant to Senator Dixon; DeForest Hamilton and Alan Cameron, assistants to Senator Denton.

SENATOR JEFF BINGAMAN, PRESIDING

Senator BINGAMAN [presiding]. I have just spoken to Senator Goldwater. He said he would like us to go ahead and get started. He will be in very shortly.

I don't have an opening statement. He may have something that he wants to put in the record when he arrives.

Why don't you go ahead with your testimony. Then we will have some questions.

STATEMENT OF HON. DONALD C. LATHAM, ASSISTANT SECRETARY OF DEFENSE, COMMAND, CONTROL, COMMUNICATIONS AND INTELLIGENCE, ACCOMPANIED BY GEN. C.E. McKNIGHT, DIRECTOR OF COMMAND, CONTROL AND COMMUNICATIONS SYSTEM DIRECTORATE, ORGANIZATION OF THE JOINT CHIEFS OF STAFF, AND LT. GEN. DAVID K. DOYLE, DIRECTOR OF COMMAND, CONTROL, COMMUNICATIONS, AND INTELLIGENCE

Mr. LATHAM. Thank you very much.

I am Don Latham. I would like to introduce the session today. We will start off with General McKnight from the Joint Staff to provide an overview on interoperability. I will follow that with a viewgraph briefing to try and summarize where we are in this entire command and control area with emphasis on our interoperability and the command and control problems that brings. I will follow that with a discussion of the electronic combat area, specifically where we are going there, because that highlights some of the more critical tactical problems we face today.

Sitting here are the senior officers from the services representing both the command and control and electronic warfare, electronic combat side of each of the service staffs.

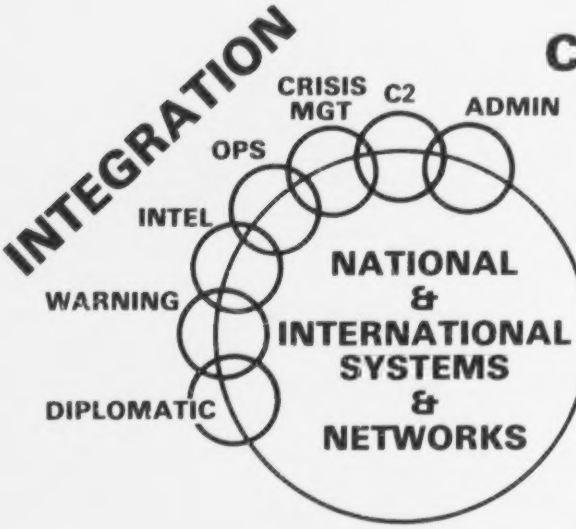
So, if there are any particular questions on any equipment or anything, they are prepared to answer those.

If there are no questions, I will start with General McKnight.

General McKNIGHT. Good morning, sir.

INTEROPERABILITY

The need for the U.S. forces to be able to operate with each other and with our allies has never been greater. Interoperability is difficult for many reasons, but probably most important because interoperability does not stand alone.



COMPETITION

- **YEARS OF EVOLUTION**
- **$ BILLIONS INVESTED**
- **TELECOM SVCS.**
- **VOICE**
- **DATA**
- **TV**

FEW STAND ALONES –
HUMAN & ELECTRONIC INTEROP VITAL !

When we talk about interoperability, you have to talk about the integration of not only small networks like the diplomatic networks, warning, intelligence, operations, crisis management, command and control, administration, and so forth, but you have to put them in context with all the national and international systems and networks which are mostly commercial in nature.

You have very few stand-alone systems. You have to have the integration of both the human and the electronic means in order to say that you have an effective system.

The national and the international systems and networks really have evolved over many, many years with billions of dollars invested. You have all of the various media kinds of products: telecommunication service, voice data, TV, and there is fierce competition in the creation of the inter networks and intertwining of these networks.

Part of the interoperability problem is that we have very few stand-alone systems, but it does reflect the dynamic integration of all of those when you talk about interoperability.

STRATEGIC PLANS AND RESOURCES ANALYSIS AGENCY

JOINT REQUIREMENTS AND MANAGEMENT BOARD

JOINT TACTICAL C^3 AGENCY

Now, the Chairman of the Joint Chiefs has very recently created three organizations here which help him in his ability to focus the considerations for interoperability. The Strategic Plans and Resource Analysis Agency is like a program evaluation and analysis element within the Joint Staff. It is the secretariat also for the JRMB which is the Joint Requirements and Management Board, consisting of the Vice Chiefs of Staff of the services.

They look at interoperability problems and some of the programs which need to be pulled together to make sure that we have the interoperability addressed.

Then we have this newly organized Joint Tactical C^3 Agency at Fort Monmouth, NJ, which will be looking at all the tactical systems as far as their interoperability, their necessity to work together.

This is being spawned by the ashes, so to speak, of the Joint Tactical Communications Office at Forth Monmouth which used to be called the Tri-Tac Office at Fort Monmouth. We are now changing and putting new people in there, the kind of people that I have in my office and Joint Chiefs which are operators, communicators, engineers, all working together to meld that.

It is the flexibility and the ingenuity and the vision and the material of the commanders and staffs and the service people that we have to concentrate on. We have to pull all of these things together to ensure that interoperability occurs.

History is filled with examples of interoperability problems. Go back to World War II and you will find that time after time there are documented interoperability problems. In the invasion in North Africa by General Patton off the coast of North Africa, they had carefully installed radios to make sure they had the ship-to-shore links. As soon as they started naval gunfire the naval radios were incapacitated.

That happened again when the Marines landed at Tarawa.

Senator BINGAMAN. The three organizations are focused on interoperability among our services. You have not gotten to the description of the interoperability with the allies.

General McKNIGHT. Yes, sir, the issues that are addressed by those three bodies also include interoperability of our allies. That is another complicating factor as we all know.

C3 INTEROPERABILITY IS NOT A NEW CHALLENGE

PROBLEMS WILL NOT DISAPPEAR

KOREA
VIETNAM
NEXT?
GRENADA
WW II

C3 CHALLENGE — IMPOSING ORDER ON THE CHAOS OF CONFLICT

This is not unique and not the first time we have had any interoperability problems. I have books full of examples of interoperability problems; what we are trying to do now is focus on organizations which will enhance the merger of the equipment, the training, the doctrine, and so forth, and ensure that we do have interoperability.

C3 LESSONS LEARNED

- EARLIER, BETTER PLANNING
- NETS CROWDED AND INFLEXIBLE
- TOO MUCH DEPENDENCE ON SATCOM
- INADEQUATE MESSAGE TRAFFIC SUPPORT
- SECURE LIMITATIONS

NO SHOW STOPPERS

These are some of the lessons that we believe have been learned from Grenada. We have to bring the C^3 planning staff together as quickly as possible and make sure that we use all the resources that we have available to us.

Now, in a come-as-you-are situation it is very difficult. Most of our CINC's, commanders-in-chief, have contingency plans and they exercise those contingency plans. But when you actually have an operation and it is a short fused operation, there is no way that you can crystal ball everything.

One of the lessons learned is certainly to bring in the C^3 planner as early as possible, bringing all the communications and resources together as quickly as possible.

We found that the nets were overcrowded and inflexible. Too much dependence on Satcom. The channel for Satcom was overcrowded. It was like Shirley Highway in rush hour. So, there was an overdependence on UHF Satcom, inadequate message traffic support.

The heavy equipment was not brought into Grenada until the fifth day which would tie that operation into the Defense Communications System so that you could get all the volume message traffic you needed.

That is a judgment call because you have an awful lot of heavy equipment that takes airlift to bring in.

We improved this by joint training exercises. We had some secure communications problems. Those security problems were the result of not having enough encryption equipment in the right places. Some of that is the distribution problem. We are working on the redistribution of some of them we already have in the inventory.

Others are installing things at LANT now at the locations that have already identified those requirements and we are putting those in. I don't want to paint a good picture on that; secure voice will be a problem for us sometime in the future.

Senator **Glenn**. Did it take Grenada to bring out that basic stuff?

It is so fundamental. Grenada was nothing but an exercise as far as combat goes. People got hurt, there is no doubt. It was combat and shooting and it was live.

As far as comparision to a real honest to goodness all-out combat element, it was so elementary that I can't believe we are in this kind of trouble and only discovered it in Grenada and did not discover some of the things by the exercises we have all the time.

That may oversimplify Grenada, but I don't think it does by very much.

General **McKnight**. Sir, one of the things that has always been stressed in the training of communications personnel in any kind of exercise is to be flexible. I have books of lessons, as I pointed out, from past experience where things never work out the way they do in training.

The way to secure some of this is to put more realism into the exercises and the time compression you are working with. Every one of the CINC's has the contingency plans to work on these kinds of problems, but it is a constant, continuous thing with people changing out.

So, you have the turnover of personnel which complicates that situation. I am not trying to downplay it at all, but these lessons have been known.

I spent time as a commandant of the signal center where we put through 34,000 students every year. You try to train them not to be so dependent on the equipment and to be able to march off and stand on their feet and think and use whatever resources you have available to you at the time.

These are not new lessons. It did not take Grenada to bring that out. But equipment malfunctions were not part of the problem here. These are very basic lessons and they have been learned over and over again.

SATCOM

Senator **Bingaman**. Let me ask about too much dependence on Satcom.

Is Satcom something we can depend on at all in the situation we face in Europe?

Wouldn't that be jammed? Is this something that we would expect to use in our communications capability in Europe?

General **McKnight**. Sir, you use it because it is in the inventory right now and you use everything that you have in order to make connectivity. You can jam UHF. UHF is jammable, but we have other systems that are coming along that are not jammable.

That is one of the lessons that we point out. It was an overdependence on that particular medium.

Mr. **Latham**. We have today another defense communications satellite system known as the DSCS system. We have four satellites, four bases fully operational, [deleted].

One of those is the new DSCS–III which has a [deleted].

In the ground terminals we are employing [deleted].

The second thing we are doing is developing and have under full-scale engineering development now the newest, most capable new satellite system known as Milstar which operates at considerably higher frequencies, much wider band width and will be extremely jam resistant.

It will have terminals of much smaller size for deployment in [deleted] on the ground. We are aware of two things.

One is the jamming threat as well as the capacity issue. As I say, we have at least three satellite systems, including UHF, from which we will be transmitting, many of the critical users, to the Milstar when it comes on line to get them onto a system that is more jam resistant.

Senator **Bingaman**. Thank you.

General **McKnight**. As I said, sir, most of the C^3 problems experienced in the Grenada operations can basically be traced to deficiencies in our ability to do joint C^3 planning in support of a come-as-you-are situation.

Senator **Thurmond**. Mr. Chairman, I have one question.

General, the Joint Communications Readiness Command, I believe has capability to make various service communication assets interoperable.

Was joint communications tasked by the Joint Chiefs to support operation Urgent Fury?

General **McKnight**. Sir, I believe it was. I am not sure whether it was tasked or not, but they did use some of the equipment later in the exercise. I was at that time commanding the Army Communications Command and I was tasked to provide some equipment later on after the first day.

Senator **Thurmond**. You might check on that and provide an answer for the record.

General **McKnight**. Yes, sir.

[The information follows:]

Joint Communications/Electronic Warfare

Yes, JCS-controlled assets were deployed to Grenada. The USCINCLANT staff requested these assets and was told to work directly with the Joint Communications Support Element (JCSE) located at MacDill AFB, Florida.

JOINT C^3

General **McKnight**. I would like to repeat, joint C^3 planners must be involved as early as possible in the planning cycle. It is not just the C^3 community that needs to train. System users and operators must be able to adapt to whatever C^3 systems limitations exist and exploit whatever capability you find in a come-as-you-are war.

There was one anecdote that was put in the paper, and I could find no official documentation, of a young man using a credit card to make a phone call in calling for support. I have reason to believe that probably is true, but I could not find the documentation on that.

Again, I state that when I trained the signal officers and the signal soldiers at Fort Gordon, they were instructed to use every possible means available to them. Even though they had problems in Grenada, there was none of such a magnitude that the mission was degraded.

These were all problems that caused a great amount of frustration, but I don't believe that it should be taken out of context.

CINCLANT has put out an unclassified report on the Grenada operation and demonstrated their progress and their interest in improving all of the areas which are shown on this particular slide.

Being able to step back during an assessment of a C^3 plan during an exercise probably would have prevented an overcommitment of the use of the single channel satellite system. The area of message support also emphasizes the complexity of joint C^3 planning, but again I point out to you that when the equipment comes in, it is a judgmental call.

The high volume of traffic was not available to the ground forces until the fifth day of the exercise, but that timing and how that equipment flows in after the initial operation is a judgmental call by those on the ground.

LANTCOM has just completed in detail a review of their secure limitations. Secure telephone limitations at several CONUS locations were also identified as hampering the operations.

The commands are now reviewing the internal requirements and developing programs to resolve those.

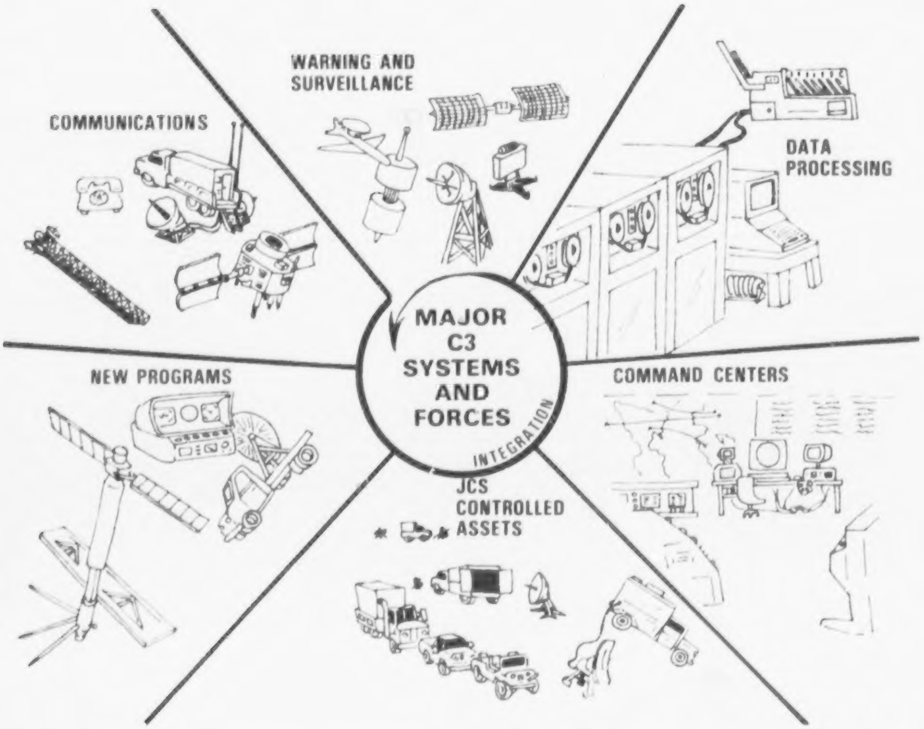
The lessons learned in Grenada or any single crisis situation must not be taken out of context. This operation only covered a very small part of the spectrum of the military strategy for which C^3 must be involved.

Our job in the C^3 community on the Joint Staff and in the services is to correctly interpret and to apply all these lessons learned in Grenada to the broadest possible aid of our worldwide mission.

I have indicated some of the ways that the Joint Staff and some of the unified and specified commands are handling the actions. The recent fleet exercise in the Pacific is a good example of some of the ongoing effort to enhance joint C^3 interoperability.

We had the links between the Air Force AWACS and the tanker aircraft and that was pointed out to be one of the great high points of the exercise, that connectivity between the tankers, the AWACS, and the naval carrier battle groups.

The services are working equally as hard to offset the problems that we have discovered in our exercises and we are assessing all of those along with the new organizations to enhance our interoperability.



We have to continue to stress interoperability criteria in meaningful terms within our equipment specifications and our agreements with our allies and with our joint and combined training exercises. It is a continuing process that is taking all of these major systems that we have including, and Senator Thurmond, you mentioned the JCSE, that is a relatively small amount of equipment that extends all of the other equipment in a time of contingency.

One of the things we are going to do is put more equipment in those organizations which have a heavy contingency commitment. But it is vital that we continually remember that we are trying to integrate all of these and the JCS is currently overseeing about 250 C^3 programs which are joint in nature.

The joint aspect takes into consideration the operational needs of the individual commanders and then merges all those needs by applying the existing international-national DOD and service standards.

The end result is going to be an integration of not only the equipment, but the people, the doctrine, the procedures to make sure that all of our equipment and all of our people have the right kind of training.

This can only come about by good training, good procedures, and a continual look at that. We have made progress, but we have a long way to go.

The improving of the interoperability is an imperative of the Joint Staff, and services are firmly committed to this cause.

Thank you very much for the opportunity to make these comments.

Chairman **Goldwater** [presiding]. It is a real pleasure to have you gentlemen here with us this morning.

I apologize for not being here at the opening, but I had an earlier meeting and could not cancel it.

Mr. Latham, do you want to proceed or do any of the members have questions of the general at this point?

GRENADA

Senator **Glenn**. We talked about Grenada. It is my understanding some of the problems in Grenada were basic equipment as well as just training and procedures that you stressed here.

Maybe I am wrong on that, but there were reports that even in a limited action like Grenada the Marine Corps and the Army had trouble talking back and forth with each other from one part of the island to the other because of equipment differences.

There were problems of fire control. The Army could not call in naval gunfire at least in part because of some of the equipment difficulties. I think it is very basic.

Do we have the right equipment, number one, in addition to the training and procedures that you stressed?

General **McKnight**. Sir, we have equipment incompatibility there is no question about it. Every day glitches are reported in one program or another that show the interoperability problems between equipments, particularly in complex equipment which have modems.

One service will buy one modem and one service will buy another model. We are correcting many of those problems. We hope that this Joint Tactical C^3 Agency at Fort Monmouth will start to focus on those kinds of problems and help us to a degree.

A lot of times when we come up with these problems they have been in the inventory for many, many years. They are the older equipment. It certainly is out there. There is no question about it.

These things as they come up, the joint exercises will do very much to continue to bring these problems out so that we can fix them. They are out there. There are many problems out there.

The complexity of these systems today is mind boggling to a degree. The way we solve it is by having competent leadership out there and people who can make sure that our soldiers are well trained.

Senator **Glenn**. I disagree with you on that. You just don't put well trained soldiers out there if the command can't use the equipment.

If the communications equipment is not interoperable, the best commander in the world can't go out and do anything.

I have an article here, Mr. Chairman, I would like to enter into the record. It is an article out of "Defense Week." This is not even interoperability. This is battlefield command that General Cheatham talked about. You may have read that thing.

He says he can't even command his own troops because they don't have the equipment to do it. The interoperability starts right within its own unit, itself.

I would like to enter this in the record because it is a damaging indictment of where we stand on this stuff. I don't think we can say the command can work around this thing because they didn't have the right equipment.

[The article "USMC General Blasts DOD Idiocy" from "Defense Week" follows:]

[From "Defense Week," Mar. 11, 1985]

USMC GENERAL BLASTS DOD IDIOCY

(By Michael Duffy)

SAN DIEGO—A two-star general who oversees one third of the Marine Corps last week criticized Pentagon weapons purchasing priorities as "absolute idiocy," saying they have left top commanders unable to communicate with—and therefore command—their troops.

Maj. Gen. Ernest Cheatham, commanding general of the 1st Marine Amphibious Force, described his unit and others like it in the Marine Corps and the Army as a "great big strong lion." But he said that the lion has "a lousy head." The head, he said "doesn't function correctly."

Cheatham made his remarks March 6 to a group of defense contractors who gathered last week at nearby Camp Pendleton. Cheatham's unit, also known as the 1st MAF, is a force of about 52,000 personnel and represents about 30 percent of the entire Marine Corps.

In an impromptu speech he described as "sorta quick and a little bit rough," Cheatham acknowledged that much of his unit's equipment was good. But he said that the Pentagon has sacrificed the needs of forces on the ground for machines with a high-technology lustre.

"We've got all kinds of neat things up in the sky to tell you what's going on someplace else, but I don't know what the battlefield looks like ten miles ahead of me," he said. Cheatham added that remotely piloted vehicles, or unmanned drones, offer promise but have yet to be fielded by American forces despite their appearance in the inventories of other countries' armed forces. Several services are still performing research on the drones, also known as RPVs.

"I know about RPVs," he said. "I know Taiwan's got them and I don't." He added that the current substitute for such intelligence gathering is scout patrols known as forward reconnaissance elements. "They're great in peacetime, but not in war. I wouldn't want to be one of them, because it's a one-way mission."

Cheatham said a similar mismatch between procurement priorities and mission needs plagues communications equipment.

"We can talk to guys on the moon but I can't talk to the guy over the next ridge," he lamented. "To me it's absolute idiocy, because if I can't communicate, I can't command and, gentlemen, I can't communicate."

Cheatham's 1st MAF includes an 18,000-man infantry division, an air wing of over 500 fixed-wing aircraft and helicopters and a force of about 10,000 personnel in support and service roles. Commander for three years, Cheatham said his frustrations are shared by commanders of other units such as the Army's 9th Infantry Division, 7th Infantry Division and 24th Infantry Division, as well as the Marine Corps. 2nd MAF and 3rd MAF. Wearing a camouflage uniform and combat boots, he said, "This feeling is not unique to me. I need help and all commanders need help."

For example, he said, the Marines don't have a "mobile functional command post," big enough to act as a battlefield nerve center yet small enough for troops to dismantle and move out of harm's way in an emergency. Cheatham said he has "given up" trying to find a suitable compromise. Instead, he would like the Pentagon and private business to fashion a command post decoy to throw off enemies who can easily uncover a command position by its radio or heat signatures. Ten such decoys, he said, would improve his command post's survivability and thus improve command and control. "If the head is dead, the lion can't fight," he said.

UHF AND VHF TACTICAL RADIOS

Mr. LATHAM. I don't know what the Marine Corps general is talking about. Today the Marine Corps has a large number of UHF and VHF tactical radios and there is no problem with one marine wanting to talk with another one at some reasonable distance that those radios are designed to work on.

If he has, for example, a marine in the Bakaa Valley and another one on the coast and trying to communicate across those mountains with a VHF radio, you are not going to do it. There are laws of physics you can't overcome.

In terms of the Marine Corps and the Army today, all they have are plain vanilla radios. They do not have jam-resistant radios. The plain vanilla VHF combat radios are in the inventory of the Marine Corps and the Army in large numbers. I don't understand the comment. I don't know what he is talking about.

Senator GLENN. I will be glad to comment. I don't think we can say the commander will work his way around this.

General MCKNIGHT. I did not mean to imply that despite the lack of equipment, he is going to work around. In 33 years of being pounded on about a lack of communications, a lot of times it is the inability of the commander to use his resources that he has in order to do his job.

That was the only point I was making in the statement, that we have to train not just the C³ community that has the technical capability to put it together, but you have to train the operators and the users of the equipment to know how to use it to the best advantage.

That is the only point I was making.

Senator GLENN. I know we are getting out of whack on order, Mr. Chairman, but were there equipment difficulties as alleged between the Army and Marine Corps on Grenada?

Was the Army able to call in naval gunfire without equipment fault or was that a personnel fault?

Those are very real problems that existed in a combat situation, limited though it was.

General MCKNIGHT. Sir, I would like to take that and give you a written answer on that.

Senator GLENN. I would appreciate it. Thank you.

[The information follows:]

JOINT COMMUNICATIONS/ELECTRONIC WARFARE

The ground force commander had all of the following fire support systems available for employment: organic mortar fire, organic artillery fire, helicopter gunships, AC-130 aircraft, naval gunfire support, and carrier air support. While it is true that only limited naval gunfire support was used, that was also true of artillery fire support. It must be remembered that both naval gunfire and artillery are area fire weapons and in most instances, their use would have been inconsistent with the rules of engagement. Coordination between the Navy and Marine Corps and coordination between the Army and Air Force were exceptionally good. There appears to have been some coordination and communication problems between the Army and Navy. Air Naval Gunfire Liaison Component (ANGLICO) teams are designed to provide naval gunfire as well as air support coordination, but problems occurred when these ANGLICO teams were not at all the right locations and some teams did not have proper frequencies and codes. While problems did occur, there were many examples where coordination worked well. For instance, in the early part of the operation at Port Salines airfield, the Army Rangers were attacked by three BTR armored personnel carriers. Two were knocked out by the Rangers and the other was destroyed by an aircraft. Helicopter gunships were used extensively by both the Army and the Marine Corps with good effect. During the operation, the most valued air-ground support system was the AC-130 aircraft. One AC-130 was continually on station. The AC-130, of all fire support systems, was the most accurate short response fire support system available and for the Army was the easiest system with which to coordinate and communicate. The guidance on rules of engagement was also a key consideration. Considering these factors, the ground force commanders picked the most accurate systems with which they were most familiar and with whom communications were the easiest.

Since Grenada, the Army and the Navy have established a better procedural working relationship in the fire support area as exemplified by joint training between the 82d Airborne and the 2d MAF ANGLICO team during recent field exercises.

Chairman GOLDWATER. Senator Thurmond?

Senator THURMOND. Mr. Chairman, I have a question here.

General, I want to ask you this question.

Were the assets available in October 1983 to make the communications systems interoperable?

General MCKNIGHT. Degrees of it, yes, sir. Now, that is the point I was making about the planning.

Senator THURMOND. In other words, were there assets available to make that communications system interoperable?

General MCKNIGHT. Degrees of it, yes, sir. It is a matter of allocation of resources against the plan.

Senator THURMOND. The Commander in Chief, Atlantic, was responsible for that operation, was he not?

General MCKNIGHT. Yes, sir.

Senator THURMOND. Did he have assets available at that time, October 1983, to make the communications systems interoperable? He either did or he didn't.

I am just asking you which?

General MCKNIGHT. I believe within his total command he had the assets, sir.

Senator THURMOND. You think he had the assets available?

General MCKNIGHT. Yes, sir.

Senator THURMOND. Then what was the trouble if those assets were not used?

General MCKNIGHT. They were not assembled in a come-as-you-are type of compression in the planning of those assets.

Senator THURMOND. Who is responsible for that?

Was the Commander in Chief, Atlantic, responsible or was someone else responsible, somebody he delegated it to? Who was responsible?

General MCKNIGHT. Sir, I am not in a position to say who was responsible for it. I tried to point out with the dissertation on the correct way for planning and exercises.

It is one of the lessons learned in this.

Senator THURMOND. I wonder if the commanders really know what assets are available and if they do know what assets are available, if they utilize those assets to the fullest to make an operation successful?

It seems to me there should be some better planning and some exercises to test these things prior to the time they go into combat.

General MCKNIGHT. Sir, I agree with you wholeheartedly. I believe I tried to point out that we are trying to stress in the exercises ways to pull all that together.

I don't believe you will ever have a program that sensitizes the commanders to every asset they have. It will be as a result of their judgment and their training.

Senator THURMOND. Thank you.

Chairman GOLDWATER. Senator Dixon?

Senator DIXON. Thank you, Mr. Chairman.

Mr. Chairman, today's discussion regarding joint communication is extremely important.

As you pointed out just recently, Mr. Chairman, it is hard to understand why in this day and age the military still cannot communicate with each other.

Just 2 days ago, the Washington Post, quoted the Marine's after action report on the Grenada invasion as saying:

> * * * the Marine battalion landing team commander on shore was restricted in the command and control of his remaining unlanded assets still on the ships offshore because he was not able to maintain adequate communication with them by radio.

Mr. Chairman, there are other instances we have heard about in this committee regarding the sorry state of the military's communications systems. Given today's technology in the communications industry, I find it hard to believe we have this problem.

I am led to believe that the communication problem is not just in equipment, but stems from the failure of the services to work together on this problem.

General, if we had this problem with communications systems in World War II, why do we still have the same problems 40 years later?

Don't the services talk to each other before decisions are made to buy communications equipment?

General MCKNIGHT. Sir, they talk to each other, but it has been an evolutionary type of thing with doctrine, that the service provides its own and they talk at certain levels, and it is a very complicated doctrinal thing that has not been well handled in the past.

We are trying to address that. We are becoming more and more purple at the top now. With all the explosions in communications and electronic equipment, it is becoming more and more of a problem.

Senator DIXON. Would it help if the Congress directed all the services to buy common equipment so that they could communicate with each other?

Mr. LATHAM. Let me answer that because I am on the equipment side of things, more so than the General.

Let me give you an example and I will address this in my briefing to you.

All the VHF line of sight combat radios that are being bought for the Army and the Air Force and the Navy will totally interoperate with each other in helicopters, fixed wing aircraft, Navy ships, and in the ground forces.

It will be a common radio, but they will not necessarily all be bought from the same manufacturer, but they will be totally interoperable.

So, we buy sometimes different equipments from different manufacturers, but what we have insisted on in that case, and I will show you several other examples that those radios are fully interoperable.

There are many more examples like that. For example, we now have a jam-resistant UHF radio in the cockpits of [deleted] Air

Force tactical aircraft called Have Quick. The Army is buying Have Quick. Our NATO allies are buying Have Quick.

We will have not only interoperable UHF radios but they will be interoperable in a jam-resistant mode, but they will be built by different manufacturers in some cases and bought by the services independently.

We have insisted when the electromagnetic wave goes through the air, they can talk to each other even though the radios are different. They are not the same radio, but in the Have Quick mode they talk to each other and that is all we need.

General McKnight. Sir, may I make a comment?

Senator Dixon. Sure.

General McKnight. Oftentimes we try to build purple equipment, one piece that takes care of all the services. When we do that, many times we find out by lumping all the requirements, we come up with a very, very expensive piece of equipment.

What we need to do is to concentrate on making sure that it will electronically interoperate rather than having clones of each piece of equipment made by the same corporation, because we argued service to service over the Tri-Tac systems as we started to produce those and we broke out a lot of those particular systems over many, many years because of the service requirement within each one of those pieces of equipment.

It is far better in my perception to have the correct standard so that all the equipment will interoperate together than forcing each service to buy something that works under water or at 50,000 feet, or whatever.

For years and years we have dragged out that requirement of mil spec equipment and it has cost us a tremendous amount. That is part of the dilemma that we are in because the equipment is so expensive to buy, sometimes we can buy only limited quantities of it.

Senator Dixon. Are you both telling me, General McKnight and Mr. Latham, if I understand what you are saying correctly, that prospectively at least it is the opinion of both of you that the various branches of the service can communicate adequately among one another, notwithstanding the fact they may be purchasing different types of equipment, it will interrelate between the services adequately?

Is that your response now?

Mr. Latham. Yes, it is.

General McKnight. There are plenty of problems out there, sir, but we are working toward that electrical interoperability.

Senator Dixon. Thank you, Mr. Chairman.

Chairman Goldwater. General, it is good to see you again. We certainly welcome your testimony. I have just one question for you stemming from your testimony.

COMMUNICATIONS INTEROPERABILITY

What is being done to resolve the doctrinal problems encountered at Grenada, and I refer to communications interoperability?

General McKnight. We are working the doctrinal interoperability problems with the services down through each one of their doctrinal formulation centers and also, at the joint level, at the Armed Forces Staff College and at the War College.

We are taking these lessons learned in Grenada and melding them together to make sure that that sensitivity gets out at every level, particularly at the operator and commander level, so that that doctrine can be changed, and make sure that it is there so that we can do more realistic exercising, and these problems won't continue to haunt us.

Chairman GOLDWATER. I am glad you are on that.

I have a statement that I would have made had I been here at the opening which I will ask be made a part of the record. But there is one small part of it I would like to read because I think it will indicate the great, deep concern of this committee.

I can't really think of any one item that we are going to discuss this year that will lend more importance to the overall success of our military than the ability to talk to each other. It is nothing new. We had it in World War I.

God knows, they had it before then. They had it in Korea. They had it in Vietnam. And from exercises I have seen, we still have trouble.

Each of the services is spending vast sums to develop and procure modern communications equipment. It is absolutely essential that this equipment be developed with primary consideration given to the requirement for interoperability, wherever it may be appropriate.

This interoperability should extend not just to the sister services, but also to our NATO allies. God forbid we should wait until our troops are committed to combat before we discover that Army troops can't communicate with Air Force close support pilots, or that Air Force interdiction pilots can't communicate with NATO air defenders, or Navy fighter pilots can't communicate effectively with Air Force or with NATO AWACS.

Similarly we must ensure that the vast sums being spent to develop electronic warfare systems will be applied to ensure the development of systems which are compatible and mutually supportive.

I am concerned that I continue to hear reports that the services, with or without the blessing of the Office of the Secretary of Defense, continue to develop communications systems which have at best limited interoperability.

Furthermore, stories that have come out of our experience in Grenada suggest that our problems are not limited to equipment, but extend as well to operational doctrine.

[The prepared statement of Chairman Goldwater follows:]

PREPARED STATEMENT BY SENATOR BARRY GOLDWATER

This morning the committee meets to receive testimony on the subject of interoperability of communications equipment and the joint deployment of electronic warfare assets.

These are subjects of growing concern for the committee.

Each of the services is spending vast sums to develop and procure modern communication equipment. It is absolutely essential that this equipment be developed with primary consideration given to the requirement for interoperability wherever it may be appropriate. This interoperability should extend not just to the sister services, but also to our NATO allies. God forbid we should wait until our troops are committed to combat before we discover that Army ground troops can't communicate with Air Force close air support pilots, or that Air Force interdiction pilots can't communicate with NATO air defenders, or that Navy fighter pilots can't communicate effectively with Air Force or NATO AWAC's.

Similarly, we must ensure that the vast sums being spent to develop Electronic Warfare systems will be applied to ensure the development of systems which are compatible and mutually supportive.

I am concerned that I continue to hear reports that the services, with or without the blessing of the Office of the Secretary of Defense, continue to develop communications systems which have at best, limited interoperability. Furthermore, stories that have come out of our experience in Grenada suggest that our problems are not limited to equipment but extend as well to operational doctrine.

We are well beyond the point where we can afford the luxury, or the folly, of permitting each service to develop its own unique communications and electronic warfare equipment with little or no regard for the needs of interoperability.

We are pleased to have with us this morning to address these issues Mr. Donald C. Latham, Assistant Secretary of Defense Command, Control, Communications, and Intelligence; and Lt. Gen. C.E. McKnight, Director of Command, Control, and Communications System Directorate, Organization of the Joint Chiefs of Staff.

Mr. Latham has the responsibility in OSD for coordinating the efforts of the various services and ensuring interoperability is achieved. General McKnight will address some of the lessons learned from the Grenada experience and will discuss the role of the JCS in striving for interoperability.

We are also pleased to welcome Lt. Gen. David K. Doyle, Director of Command, Control, Communication and Intelligence; Rear Adm. Lawrence Layman, Director of Naval Communications, Office of CNO; Brig. Gen. Wayne Knudson, Director Force Requirements and Army Aviation Office; Comdr. Hugh L. Webster, Director Electronic Warfare Division in OPNAV; and Brig. Gen. Jerry W. Tietge, Director Electronic Combat.

Chairman GOLDWATER. I can't emphasize too much to my good doctor, that received the finest education that anybody could receive anyplace, having gone, incidentally, to the University of Arizona, but I won't stress that, there has always been, with due respect to the marine sitting here with us, and members of the other services, I have heard from ground commanders of World War I, ground commanders of Korea, ground commanders of Vietnam, why can't the Air Force be as good in ground support as the Marines?

Has anybody looked at this to see whether the Marines have a better way of talking to the ground commander so that they do not foul up our own troops instead of the enemy's?

Why don't you look into it.

COMMAND AND CONTROL

Mr. LATHAM. After that opening statement, I will try.

What I would like to do is talk today about the command and control area. I would like to start out with a view of what I call integrated air/land combat operations, to try to stress our problem of joint air/land combat and not just the command and control of the battle, but the integration of sensors and communications with the weapon system itself.

GOALS AND OBJECTIVES
TACTICAL SYSTEMS AND INTEGRATED C^3I

- EMPLOY AN INTEGRATED SYSTEMS APPROACH
  - JOINT REQUIREMENTS
  - TACTICS
  - WEAPONS/C^3I
- DEVELOP ALL-WEATHER/NIGHTTIME ENGAGEMENT CAPABILITY-FROM STANDOFF
  - ASARS II
  - SIGINT
  - JSTARS
  - JTACMS
- EMPHASIZE ELECTRONIC COMBAT AND C^3
  - LETHAL
  - NON-LETHAL
- SURVIVABILITY AND ENDURANCE PARAMOUNT
- EMPLOY TACTICAL DECEPTION
- WIN!

First of all, what we are trying to do is employ an integrated approach to this situation and it is very clear that every operation now is clearly a joint operation and may involve all four services. This jointness has to do with starting back with requirements, it has to do with the tactics area and doctrine and in the design and employment of the weapon and supporting C^3I themselves.

What we are doing is trying to develop an all-weather nighttime engagement capability from standoff. The interdiction problem is a serious one. That presents some of the most challenging interoperability problems at the command and control level and weapon level we have ever had.

JOINT STARS

We are developing a series of capabilities, for example, the Joint Stars is a joint program between the Air Force and the Army.

We are developing a C-18 aircraft using a 707 airframe, and the backend has a battle staff with green and blue suits. There will be a joint allocation of weapons and targets between the two services in the backend of the aircraft.

Chairman GOLDWATER. Can you get the Navy in on that?

Mr. LATHAM. The Navy on the Joint Stars? They are interested in the radar part of the Joint Stars Program and are looking at that radar for possible naval applications.

In terms of the air/land battle, that is strictly an Air Force and Army program right now, but the Navy is looking at possible application of the radar.

Chairman GOLDWATER. It might not be. You might have to call the Navy in or the Navy might have to call the Army in.

Mr. LATHAM. One of the beauties of this concept is that we can fly that aircraft completely self-contained and can carry the missiles on attack aircraft, which are called JTACM missiles, that are being developed jointly with the Air Force, Navy, and Army for ship and land attack and you can fly that aircraft anywhere and support a multiservice operation.

Senator **Glenn**. Here we go again, not getting command people in the right spot to do what has to be done. You are going to have naval aircraft flying several hundred miles in from the ocean to do things in the air/land battle and give support as well as naval gunfire.

Will all that be capable of being developed and controlled from this command ship you are talking about?

Mr. **Latham**. The communication system that will be onboard the Joint Stars aircraft is fully interoperable between services. We will have a JTIDS terminal onboard which is an equipment that can talk air to ground, air to air in all the services, plus all the UHF equipment onboard is interoperable between all services.

If a naval fighter needed to talk to the Joint Stars aircraft and have a coordinated strike and it was carrying the JTACM missile, it could be done.

Senator **Glenn**. The problem is this. If you have a command thing up there, and they are going to assign targets, I gather?

Mr. **Latham**. That is right.

Senator **Glenn**. I know exactly what happens in a situation like that. You might be able to use a naval asset, but because the Navy blue suit is not sitting there, he is not going to get called on, somebody else will take it, because of the turf fight, and so on.

I have been through all these routines in the past. Unless you have a command structure that has all the arms available to bring to bear on the combat area, you will set up a partial command to have targets selected.

Mr. **Latham**. [Deleted.] They can be fully integrated. The communications are there and I will get to how we are going to do that in a minute for them to be fully interoperable.

This Joint Stars Program was not envisioned as anything but a development program for an air-to-ground attack system against land combat targets.

It could be used in an amphibious attack role if we have to with the Marines and the Army. It is a fully self-contained system.

Chairman **Goldwater**. Does it make any sense not to include it in your plans now?

I just can't believe that in future combat there might not come a time when we would not call for ground support from the Navy or the Navy might call for air support from the air.

Mr. **Latham**. Absolutely.

Chairman **Goldwater**. If they can't talk to each other——

Mr. **Latham**. Senator, I can assure you that today they can talk to each other and they will be able to talk to each other in the future better.

In the future they will have jam-resistant systems of which we have only a limited quantity today. We have plain vanilla UHF and VHF radios in the aircraft today. They can talk to each other.

You had better make sure you know what the frequency plan is today, but the radios will interoperate. We have a standard 225 to 400 megahertz radio in every tactical aircraft.

Chairman **Goldwater**. Are all UHF bands comparable, the same band, Navy, aircraft?

Mr. LATHAM. Yes, you have ARC-159 radio in naval tactical aircraft and the ARC-164 in USAF tactical aircraft. They both operate at 225 to 400 megahertz. They have the same channel spacing, and so on. So, if a guy calls you up, the other guy dials the same frequency and they can talk.

In employing this Have Quick jam-resistant version, the Navy is putting it in a new more modern radio called the ARC-182. It operates with a Have Quick module. We tested this out at sea on SS *America*. They can talk to each other, secure and jam resistant at UHF.

Chairman GOLDWATER. In this air-ground equipment, do you get into gigahertz at all?

Mr. LATHAM. We will be moving in the frequency ranges in the satellite area up into the higher frequencies, so-called gigahertz range, but not in tactical radios in the aircraft, although you can redesignate the frequencies.

The new JTIDS radio operates from 960 megahertz to 1,215 megahertz. I could call that 1.2 gigahertz if I wanted to.

In this integrated air/land operations we are emphasizing electronic combat and command and control. The point I am making here is that it is both a lethal and nonlethal approach you have to take. It is not one or the other.

Survivability and endurance is paramount. We are looking at this across the board in our strategic and tactical systems. This means you have to have survivable electronic systems which means they have to be able to survive in a jamming environment.

We want to employ tactical deception. That is an integral part of warfare today, stressing interoperability and command and control. We are doing more in this area and it has tremendous payoff.

Again, it is a joint operation and it is going to have to be worked out carefully, but it has enormous payoff.

Let me talk now about some program initiatives that address interoperability.

First of all, the Army has done a very detailed look at their air/land combat architecture and has restructured that significantly over the past couple years. They wanted to get equipment in the hands of the Reserve and Guard and Active Forces faster, save some money and get a number of people out of the Signal Corps.

That has been accomplished on paper.

One of the major initiatives in the budget this year is a request for some $335 million in procurement for a new initiative called the mobile subscriber equipment [MSE]. That is a battlefield radio telephone system employed in the divisions and corps to provide a highly mobile, much more survivable system.

BATTLE DOCTRINE CHANGED

- HOW WE FIGHT DETERMINES NEED FOR COMMUNICATIONS

  DOCTRINE OF 1960 AND 1970's

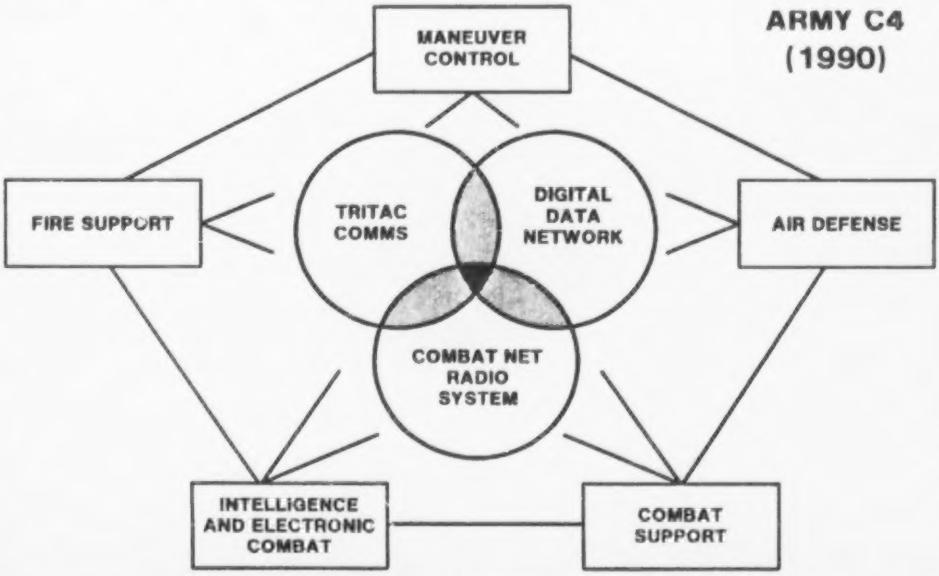
  DIVISIONS FIGHT - CORPS SUPPORT

  DOCTRINE OF 1980's

  CORPS COMMANDER FIGHTS USING ALL AVAILABLE AIRGROUND ASSETS TO SEE AND STRIKE BEFORE ENEMY TROOPS REACH A "FRONT LINE"

- ARMY FORCES ARE HIGHLY MOBILE
- COORDINATION OF FIREPOWER ESSENTIAL TO SUCCESS
- THEREFORE COMBAT COMMUNICATIONS MUST CHANGE

The battle doctrine that has driven this is summarized here, and as a result the need for battlefield communications in the sixties and seventies was different than it is today. Much more mobile forces today and more real-time coordination of fire power are essentially what we have been talking about.


ARMY C4
(1990)
MANEUVER CONTROL
FIRE SUPPORT
TRITAC COMMS
DIGITAL DATA NETWORK
AIR DEFENSE
COMBAT NET RADIO SYSTEM
INTELLIGENCE AND ELECTRONIC COMBAT
COMBAT SUPPORT

Combat communications have changed. That has driven us to the lighter, more mobile system like the MSE. You will notice the five needs.

The several networks are the combat net radio system, a digital data system and Tri-Tac communications or area communications network. There is designed in overlap. They must be capable of interoperability and sharing data back and forth. That is a key part of the Army's architecture to do that.

MSE will be deployed in the same zones as the combat radios are and must also talk to the Tri-Tac equipment. We are assuring there is interoperability between all of these to support these five different nodes.

Chairman GOLDWATER. Is there any one place that a member of this committee can get a better understanding of that concept?

Mr. LATHAM. Physically a place to visit?

Chairman GOLDWATER. Yes, to sit down and have them twist the dials.

General DOYLE. We can easily do it here.

Mr. LATHAM. Fort Levenworth.

Senator WARNER. The witness said we can easily do it here. He might expand on that.

General DOYLE. It would be a simple matter.

Chairman GOLDWATER. I don't think it would, with all due respect to my friend. It would not be a simple matter to properly demonstrate it. You have to demonstrate it in action.

General DOYLE. At Fort Huachuca we have a setup, an extensive test bed for Tri-Tac communications.

This digital network will be tested out there. If you want to go and see a live test with live equipment, probably the better place to go in terms of physically seeing hardware, and so on, is at Fort Huachuca.

Chairman GOLDWATER. You let me know when the digital is ready. I would like to visit that. It is a good concept if it works.

General DOYLE. Yes, sir.

Chairman GOLDWATER. You will let me know?

General DOYLE. Yes, sir, we certainly will. The digital position location and reporting system is in production in the Army. We will put that together for you.

What happened when the Army took a look at their 1960's architecture is that they found numerous problems. As a result of the study, we are able to reduce the types and amounts of equipment planned for the inventory they were going to procure.

They took a lot of people out of the signal corps. We brought the size of the equipment down such that we can get it on a lot less aircraft in order to move a division worth of communications equipment.

This is now underway, being restructured in the Army itself.

Chairman GOLDWATER. It is too large for the C-141?

General DOYLE. It is not too large for the C-141. It took too many of them. It took too many C-141's to move the division and corps level signal corps equipment.

What they have done in restructuring their architecture with mobile subscriber equipment and not buying large pieces of gear in its place is that you are able to move equipment with a lot less airlift. It will fit on the aircraft.

It must mean less aircraft to move it.

General MCKNIGHT. We did have some of the older equipment, sir, that needed the C-5. The 11th Brigade at Fort Huachuca took a C-5.

Chairman GOLDWATER. You had better start making it smaller.

Senator BINGAMAN. You said you are going to shift a bunch of people out of the signal corps.

Mr. **Latham**. The number at the time, about a year or year and a half ago, that we were able to come up with was approximately 5,000 people could be taken out of the signal corps and still provide the necessary communications support.

Since then the Army has activated two new divisions. So, we have to supply the communications people and equipment for those two divisions. The actual saving is less than 5,000, more like 2,000 or 3,000.

JTIDS

Let me introduce the joint tactical information distribution system or the acronym JTIDS. This is a program in development since the late seventies. It is a voice and data system which operates with digital bits in the air and not analog.

It is a very, very advanced concept. It will allow you to communicate both voice and data. You can have this in aircraft, on the ground, and it can be used at sea.

The Navy intends to put this in all their tactical fighters and surface ships. The Air Force will put it in the F-15. It is already deployed today in AWACS, both NATO AWACS and U.S. AWACS.

This is a system that allows you to have a large number of subscribers to a network. It allows you to transmit digital data to and from cockpits such that you can tell the man where he is precisely. You can automatically display things for him so you don't have to tell him in voice.

On the F-15 you are going to see a new multicolored display on which situational or threat information will be passed to the pilot automatically as he performs the mission.

In the Navy we are doing the same thing on the F/A-18 and F-14. The Navy JTIDS program is also going to be procured for the Marine Corps. The Air Force has a joint JTIDS program with the Navy and Army.

They used two different kinds of architecture so-called. One uses a time division multiple access [TDMA] concept. The other one uses a distributive time division multiple access or DTDMA. This is the Navy system.

Is that bad? I don't think so because it turns out we have ensured that the Navy terminals and Marine terminals can talk to Air Force and Army terminals under any circumstances that they would be deployed.

For example, if an F-14 were to be controlled by an AWACS, which has an Air Force TDMA terminal on board, the Navy terminal can talk in this so-called TDMA architecture. He can also always talk DTDMA to platforms equipped with that terminal.

What we have done is that a Navy terminal has both D and T capability. The Air Force terminals are strictly TDMA as are the Army terminals. In order to make sure some of the circumstances we talk about today will not occur in the future and that these people can fully interoperate, we have had to enforce a backward compatibility—that is, maintain TDMA capability in the Navy DTDMA terminals.

The Navy terminals continue to have T inside them at some cost. The Navy estimate is something like 10 to 15 percent additional cost in complexity to have that in the terminal.

We have gone through endless discussions in the last 4 years on the subject of D versus T. Arguments have been made to take it out or not, do we really need it, and the answer is we are going to leave TDMA in the Navy terminals and maintain both a D and T architecture.

Chairman GOLDWATER. You have a maritime subscriber out there.

What do you do about ELF for submersibles?

ELF PROGRAM

Mr. LATHAM. The ELF program is underway. We will have the transmitter site in Wisconsin and Michigan fully operable in late 1986. The receivers have gone through development [deleted]. It is a low data rate system.

ELF is a unique Navy-owned broadcast system for the submarine forces. [Deleted.] We will put JTIDS in AWACS and in fighter aircraft.

Chairman GOLDWATER. ELF will not handle digital?

Mr. LATHAM. No, sir; it is a very slow system to pass low data rate information.

Chairman GOLDWATER. Let me ask you one more question.

Why does the Navy and Air Force have to have different architecture?

Mr. LATHAM. That is a good question. That goes back to the late seventies and it gets into doctrine and tactics primarily.

The Navy believes that the way they will operate and use this system at sea and in a battle group operation is that they need to set up a number of independent nets, ASW net and air-to-air net for battle group air-to-air, another net for the surface force, and so on.

With the distributed TDMA system you have a more flexible capability to do that. So, they opted for this DTDMA approach for the network structure they would construct in support of battle-group operations.

The Air Force and the Army, on the other hand, did not feel they would operate exactly that way and opted for the straight TDMA approach.

To complicate that a little bit further, there were some technical arguments about which one was better. Some would look at DTDMA as a more advanced version of TDMA. To make a long story short, it was driven primarily by differences in doctrine and tactics, not so much by technical differences.

Today the Navy terminals being developed by a set of companies are different from the Air Force terminals. They are going to look different, but when they start talking to each other, they will in fact interoperate at TDMA at data rates that are sufficient to support the force.

Chairman GOLDWATER. Do you endorse the development of these two different formats?

Mr. **Latham**. Yes, sir; at this point in time I do. If I could turn the clock back to 1970 and somebody said why don't we have one less architecture and try to do it all the same, you could have gotten into the detail of the doctrinal issues and maybe we could have settled it at that time.

We are now so far down the road and so well committed to this and we are starting now to get very close to production on JTIDS, we will start production in 1987, I would think it would be disaster to try to force the two systems into one today.

I have been through the stormiest meetings I have ever had in my life in that building on this issue. There is no more emotional issue in the Pentagon than secure, jam resistant, interoperable communications.

Senator **Warner**. That is nothing new. You know I have done a little research on this issue.

What is the date of the Department of Defense directive under which you now operate?

Mr. **Latham**. The interoperability directive?

Senator **Warner**. If you can call it that.

Mr. **Latham**. I hate to say.

Senator **Warner**. I know what it is.

Mr. **Latham**. 1967.

Senator **Warner**. January 28, 1967.

Mr. **Latham**. Yes, sir.

Senator **Warner**. Do you realize that I cannot find the word "interoperability" in this document?

Mr. **Latham**. It is called compatibility.

Senator **Warner**. It is not in there.

Mr. **Latham**. That is right.

Senator **Warner**. Let us put it all out here on the table because that is the function of this committee and the Congress. When you reach these logjams and have these kinds of disputes in the Department of Defense, we have a responsibility to participate in the resolution of these disputes.

Mr. **Latham**. Yes, sir; let me tell you what we have tried to do and we have failed so far.

On several occasions since that time starting in the seventies and again in 1980 and again in 1983 we tried to get a new directive through the Pentagon bureaucracy, OSD pushes the services and the JCS, and so on, to try to make it happen.

Frankly, we have not been successful in doing that because of the different views on what should be said in such a document. We are trying again to get this thing to a resolution. I think with General McKnight and myself we can probably get this thing to happen.

I might remind you that we have a lot of directives over there in that building and it is very difficult to get people to read them and adhere to what they say.

In this case it is important that we have a document that is fresh and uses the right words on this interoperability use.

Senator **Warner**. I will talk with the chairman and my colleagues on the committee, but I am not disposed to put funds in this area until such time as that directive is produced.

Mr. **Latham**. That might help.

JTIDS

Senator **Bingaman**. Mr. Chairman, could I ask about JTIDS?

I have a copy of "Aviation Week" of March 11. It says the House Armed Services Committee staff on the Subcommittee on Research and Development has recommended Navy JTIDS be canceled.

Mr. **Latham**. That is a HASC staffer and I violently disagree with him and he is wrong.

Senator **Bingaman**. What is his argument?

Why don't you give your version of why he thinks he wants to cancel it.

Mr. **Latham**. His argument appears to be that the Navy JTIDS program has been restructured and it has slipped in time over the past 2 years, the time of delivery of the first production unit and development program, and so on.

It is a very difficult technical program, so he says that the Navy JTIDS is in such technical difficulty it should be canceled.

By the way, coming down the pike is another program called ICNIA, a new integrated navigation information system, that will be on the future fighters perhaps which will also contain the JTIDS capability.

Now, ICNIA is likely to be available in the early 1990's, if we are fortunate enough to get it. I can't see our waiting for something like that when we have this JTIDS in both services almost ready to go into production.

Further the Navy has cost-capped their JTIDS program. The contractor is under the gun to pay for the final development if it exceeds the cap. So, the Government risk in terms of financial risk is gone.

We have capped it and thus it will be up to the contractors to pay for the remainder of the development if it goes over cap, and it surely will, probably by about $40 million or more. That will be shared between the two Navy contractors that are developing that terminal.

I think we have a good program and we should keep it going. I totally disagree with him on any cancellation of the Navy JTIDS program.

Senator **Bingaman**. Let me ask another question, if I can.

Based on your slide, it looks as though this whole system is dependent on a fixed center of communications.

Mr. **Latham**. No, sir; I am glad you brought that up. It is a nodeless concept therefore there is no central control facility that has control of the network.

What you have to do is design a frequency plan and a network plan for the day or week.

Senator **Bingaman**. So that everybody can communicate with everybody without going through a central control?

Mr. **Latham**. Yes, sir; the system has a very nice feature. Suppose this aircraft was 1,000 miles away from this guy. In between there are some JTIDS equipped aircraft. The JTIDS system is capable of relaying messages up to 1,200 miles. So, it has a number of features.

Senator **Glenn**. Why aren't we going with the Navy JTIDS for everybody if it has more capability?

Mr. LATHAM. Both have relay capability features.

Senator GLENN. You said the JTIDS was because of the Navy environment and ASW. I can see in a combat situation the Air Force may be required to support Navy functions out there.

Mr. LATHAM. Absolutely. Today we can do that and would be able to do that with the Air Force equipped aircraft. Suppose an F-15 had to come out and help the Navy or the AWACS had to come out. They would be able to communicate into the JTIDS network.

Senator GLENN. I thought you said the Navy JTIDS had the ASW circuits and they could work in different functions?

Mr. LATHAM. Different nets.

Senator GLENN. Well, different nets. I thought the Air Force version would not be able to operate?

Mr. LATHAM. They can if they want to. The Comsec is the same. You have to set up the network before you drive an Air Force airplane up to make sure he has done the planning so that when the AWACS drives up or F-15, or whatever, they in fact can enter the net.

This does make more complicated the planning because it is a very sophisticated system, but once you have done the planning, it can be done.

Senator GLENN. If an Air Force airplane cannot get up on all the same nets, what advantage is it to the Navy system?

Why don't we go to the Air Force system if they can operate on the same net?

Mr. LATHAM. Again, it goes back to the fundamental doctrine and tactics that drove the Navy to say here is how I want to run my battlegroup, that says I want to set up several nets and use the system in that manner.

I don't see again today that you would want to try to take one service's equipment and force the other guy to use it.

We have spent tens of millions of dollars, the Navy has, in designing the equipment that will go into the F-18, F-14, and A-6 and other aircraft. The so-called aircraft integration problem or group A, in which you are integrating something as sophisticated as JTIDS requires extensive engineering and design—all of which costs large sums of money.

JTIDS gets hooked into the digital equipment on board the aircraft and interfaces with the navigation equipment and data base. If you have to redo that, you are going to lose a year or year and a half at least. You will have to redo all of group A if you want to take the Air Force class two JTIDS and place it in the F-18—if it could physically fit—which at this time it does not.

It does not fit because it is too big and that could cost you another large sum of money and a year and a half in valuable time.

Senator GLENN. I was not proposing we cancel the system. I was wondering how we got into a mess when we have duplicate sets of equipment that are supposed to do the same job.

Mr. LATHAM. They fully interoperate in a TDMA mode. Now, it is true that the TDMA terminal will not communicate in a DTDMA mode. We can interoperate, by the way, at data rates around 57 kilobits when communicating in TDMA. It is not a little pipe. It is a big data pipe.

The second point is they both perform the same functions. When you set up a network with these terminals, D terminals instead of T, you can set them up somewhat differently than you can with the T network.

They look different, they are of different manufacture. We are only going to produce in this case 2,000 for the Navy and I don't know how many for the Air Force, but it is in the hundreds at least and maybe a thousand for the Army.

This is not a big, high volume issue, so you don't get a large saving from having one guy doing it all. We have it set up so that in both the Navy and the Air Force programs the terminals can be competed within the teams.

Senator **Warner**. We got a briefing the other day in the Strategic Subcommittee on how the B-52 carrying Harpoon for a specific purpose, participating in a naval scenario and lending support to our fleet in an air-to-ship mode.

In other words, they will participate in strikes against the opposing fleet units.

Suppose those B-52's require air cover from a carrier deck. I want to know how those two operations are going to take place and can the F-18 talk to the B-52 as he is coming in on his strike?

Mr. **Latham**. The answer is today he talks on UHF radio. [Deleted.]

In the future we may employ JTIDS on the B-52G's.

Senator **Warner**. How about the F-18 pilot talking to the B-52 pilot in an electric jamming environment?

Mr. **Latham**. He will have to do it with his [deleted] radio or JTIDS. That will ensure interoperability between the two forces.

Senator **Warner**. How many years away is that?

Mr. **Latham**. You probably won't see a JTIDS production terminal until late 1989. It will be late eighties and in the nineties.

Senator **Warner**. You were about to add some other factor.

[Chart deleted.]

Mr. **Latham**. I was going to try to talk about the seriousness of this jamming problem. This is exercise data from the Green Flag Exercise at Nellis. Note that this is a plot of percent of noneffective sorties.

Look where the bars are, [deleted] percent on all the different types of sorties the Air Force runs.

What this illustrates is that you can [deleted].

Today we have [deleted] of those Have Quicks deployed in the Air Force. The guys that weren't equipped had [deleted]. So, we learned our lesson and we know what we need in the way of jam-resistant communications.

In addition to JTIDS we have another program called enhanced JTIDS [EJS] program which takes the JTIDS technology and moves us into yet another frequency band which compounds the bad guy's jamming problem. With additional bandwidth you also can realize a more robust antijamming system. We have also added the JTIDS L band capability so that EJS will be capable of both data and voice communications.

EJS will become the voice radios that we will use for very, very high jam resistance. That comes in the inventory in [deleted].

[Chart deleted.]

This is a list of Tri-Tac things you have heard a lot about. You will notice the contract award dates are all near term, most of them. A lot of these are already producing hardware so that by the end of this decade there will be large volumes of hardware moving into the field.

In the Army alone the production numbers for the Tri-Tac program are around [deleted]. One of the biggest ones is MSE, mobile subscriber equipment. The Army intends to award the contract for production in July of this year.

That is going to be a biggy because that program is worth about $4 billion. Interestingly, that will be a contract in which either the French or the British, which are part of the American teams, will heavily participate because they developed the basic equipment before we did.

They teamed up with the American people in order to supply that off-the-shelf equipment to us. We will see the two-way street going the other way heavily when the MSE award is made.

Senator BINGAMAN. On the earlier slide you have the jamming problem, [deleted].

Is the same problem [deleted] with our allies?

Mr. LATHAM. [Deleted] radio systems today.

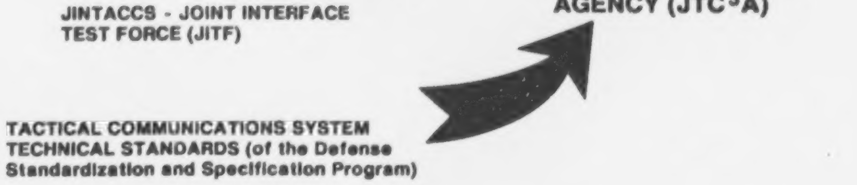
Senator BINGAMAN. We are basically saying the allies are [deleted].

Mr. LATHAM. [Deleted].

Many of them signed up. We are gradually getting the NATO allies onboard [deleted].

Let me talk about this interoperability problem.

FORMATION OF JTC^{3}A



JOINT TACTICAL COMMUNICATIONS OFFICE (JTCO)

JTCO - JOINT TEST ELEMENT (JTE)

JOINT INTEROPERABILITY OF TACTICAL COMMAND & CONTROL SYSTEMS (JINTACCS)

JINTACCS - JOINT INTERFACE TEST FORCE (JITF)

TACTICAL COMMUNICATIONS SYSTEM TECHNICAL STANDARDS (of the Defense Standardization and Specification Program)

JOINT TACTICAL COMMAND, CONTROL, AND COMMUNICATIONS AGENCY (JTC^{3}A)

As General McKnight said, we formed this new agency, The Joint Tactical Communications Command and Control Agency (JTC^{3}A) with Headquarters at Fort Monmouth. The JTC^{3}A will also have a Washington office. It was formed out of the units shown here.

One of the most important is JINTACCS.

JOINT TACTICAL C^3 AGENCY (JTC^{3}A) MISSIONS

Ensure interoperability of tactical C^3 systems—joint a combined operations. Develop and Maintain Joint C^3 architecture. Develop and maintain joint standards and interface definitions. Provide joint test/evaluation capability: test standards; test beds.

The agency is structured to do these kinds of missions. It is to look at joint problems, look at interoperability problems, look at standards for interoperability, it is to maintain those standards and provide joint test facilities to make sure we can test to those standards and keep them up.

JTC^{3}A STATUS

Agency established in 1984. About 300 personnel on-board. Initial tasks underway: JINTACCS; test beds; standards; architecture. Budget formulated and supported.

In 1986 the request is about $100 million for JINTACCS and to do all the testing. The agency has been established. There are only a little more than 300 people. Over 100 of those are at Fort Huachuca.

These are initial JTC^{3}A tasks which are underway here, the biggest being JINTACCS, the next biggest is test beds. We have a budget formulated.

THE JINTACCS PROGRAM SCOPE

Achieve interoperability and compatibility of tactical command and control systems used in joint and combined operations thru: development and maintenance of message standards for manual and automated command and control systems; participation in international interoperability efforts: NATO, PACOM, and other allies.

JINTACCS is a program underway for a long number of years under various names. It is a very major effort between all the services. It is to develop and maintain message standards for both manual and automated systems.

Today what has been the payoff? If an AWACS "drives up" to a battle group today, since they don't have JTIDS terminals, how do they talk to each other in a common message format?

Will they have what is known as link 11?

Link 11 is a standard message data system that we have standardized in the Navy, Army, Air Force, such that Link 11 messages go from AWACS down to a ship in a format everybody agreed to.

If the ship wants to send a message to AWACS it could use Link 11 or UHF voice. They pass the air-tracking information primarily on Link 11. This JINTACCS program has been developed over a long number of years.

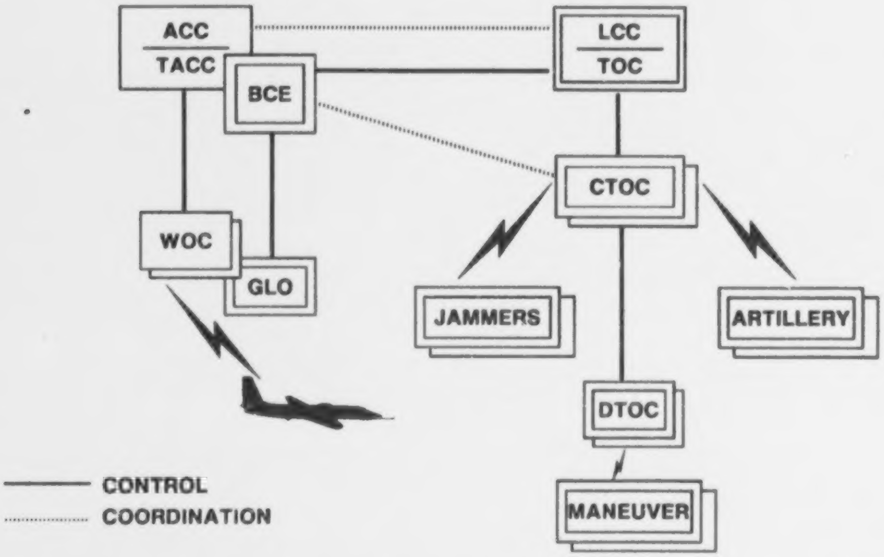
Do our allies have Link 11? Yes, some of them do, so that on U.S. Navy ships we can exchange messages with say a British ship using link 11.

What is the program status of so-called character-oriented messages? Design and testing is complete. Implementation is on schedule. We are doing this with our allies and interfacing with our allies.

The character-oriented message standard is complete. That is the message standard in TADIL-J that will be used in the JTIDS Program.

We are setting up a joint test bed to make sure that does, in fact, do all it is supposed to do. We will have an IOC for JTIDS TADIL-J in 1989. We are completing message standards to transfer to NATO.

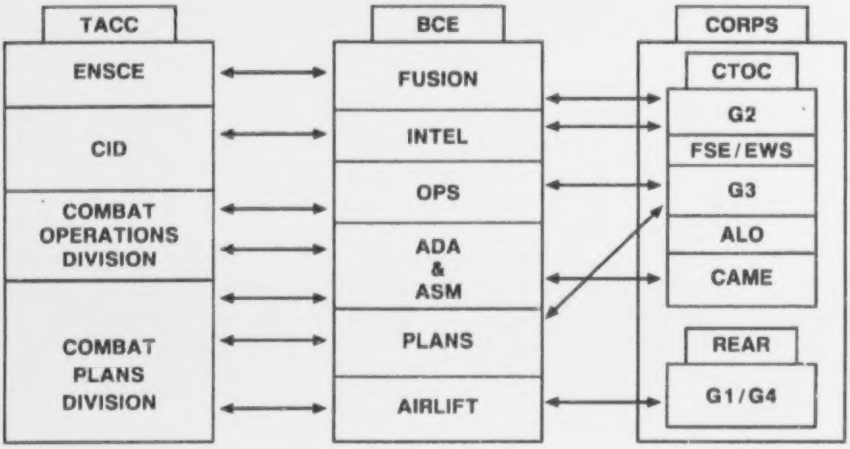
AIR INTERDICTION INTERFACES


ACC
TACC
BCE
LCC
TOC
CTOC
WOC
GLO
JAMMERS
ARTILLERY
DTOC
MANEUVER
CONTROL
COORDINATION

Let me point out a couple possibilities to show you we have been doing something about this. Suppose somebody said on an air interdiction mission, can the Air Force talk to the Army and vice versa?

That has been done. Shown here in red are the control lines. Shown here in blue are coordination lines between the air command and control system and land command and control system.

TACC/CORPS INTERFACE


TACC
ENSCE
CID
COMBAT OPERATIONS DIVISION
COMBAT PLANS DIVISION
BCE
FUSION
INTEL
OPS
ADA & ASM
PLANS
AIRLIFT
CORPS
CTOC
G2
FSE/EWS
G3
ALO
CAME
REAR
G1/G4

This is a generic viewgraph. It could be in Korea or Southwest Asia. This has been taken care of in the doctrine and planning for joint operations.

There is, in fact, a manual that has been developed between Air Force and Army that describes this.

There are Air Force and Army officers that are exchanged between the corps and Tacair command and control systems so that you can in fact ensure air coordination and make this operation work.

Now let me show you some examples, and it has not been all horror stories.

INTEROPERABLE SYSTEMS EXAMPLES

Milstar EHF communications satellite. All Tri-Tac equipments. Sincgars VHF jam resistant radio. Have Quick UHF jam resistant radio. Joint tactical information distribution system (JTIDS). VLF-USAF airborne C^2 platforms to nuclear submarines. HFAJ.

First of all, the new Milstar UHF communications satellite. We are paying some money for it for interoperability. I guarantee that has a higher degree of interoperability than any communications system of this complexity ever undertaken. [Deleted.]

If he is going to go 22,000 miles up and down, he can do it. That is the most fully interoperable system we have ever developed.

We have a joint terminal office. It has been a very good program. All four services participated in that terminal office.

All the Tri-Tac equipment is interoperable. We have ensured that. We have paid some penalty for it. Some equipment came out looking like a "camel" to some extent, but it does interoperate.

SINCGARS is the new jam-resistant VHF radio. All services will have it. It will fully interoperable but different manufacturers will produce the radio.

Have Quick we talked about.

Senator **BINGAMAN**. The information I get from staff is that we have the SINCGARS made by ITT, Germany has SINCGARS made by ITT and we are not fully interoperable with Germany on this.

Mr. **LATHAM**. That is correct.

Senator **BINGAMAN**. What caused that problem?

Mr. **LATHAM**. Their radio is not a SINCGARS, first of all. It employs a completely different ECCM concept. However, in the plain vanilla VHF band which is the military band 30 to 88 megahertz, the two radios can interoperate.

Senator **BINGAMAN**. I don't mean technically what caused the problem. If in ITT you have the same corporation making our radio and their radio, why can't we make them interoperable?

Mr. **LATHAM**. Because they are completely different designs.

Senator **BINGAMAN**. Is there a reason why they are different designs except a foulup?

Mr. **LATHAM**. Yes. One was designed to American specifications on a completely different timetable than the German radio. We are in production on SINCGARS. They are a ways from going in production.

It was designed to German specs to a different concept of jam-resistant approach than we took. We had the two ITT divisions get together and asked could you make the radios in fact work?

The answer is you cannot without major redesign of one or the other.

Now, we decided then that that is just in the too hard pile to try to force one or the other to completely redesign so that American radios can technically be interoperable with the German radio.

There are bigger problems. There are tactics, doctrine, procedure and language to worry about as well. The easiest thing to do [deleted] what you do is you deploy SINCGARS with U.S. forces and exchange liaison teams.

When you want to talk from a U.S. brigade to a German brigade, you send a liaison team and he takes a SINCGAR radio with him and he speaks English. There is a simple solution to the thing rather than try to force two radio designs together that never intended to be the same design.

Senator BINGAMAN. Basically you are saying if we are going to have interoperable radios with the allies, we just have to have liaison teams over there?

Mr. LATHAM. In this particular case with our VHF combat radios, that is the answer.

Senator BINGAMAN. That is planned? From now on we will have our liaison teams with their units?

Mr. LATHAM. I think that is probably a better solution anyway in a tactical sense. The problem extends way beyond Germany.

[Deleted.] They have equipped their forces with all brandnew radios [deleted]. I said, how do you operate?

[Deleted.]

Senator BINGAMAN. You are saying our estimate is that [deleted].

Mr. LATHAM. [Deleted.]

I can't do anything about that. We have offered the SINCGARS design to them, and so on.

HAVE QUICK

In the case of Have Quick, the British have bought Have Quick. They decided not to buy it from the U.S. manufacturer. What we did, our manufacturer of Have Quick licensed a British company to produce the radio. They are designing their version of a Have Quick radio.

We are about to do the same thing with the Germans. All of the F-16 equipped nations have elected to buy Have Quick. They may buy them directly from the United States or European source.

In the case of SINCGARS, the VHF combat radio, that is the story.

The French have another VHF radio, by the way which will not interoperate in our ECCM mode with SINCGARS. It is a very difficult problem.

Chairman GOLDWATER. I just have a short question, doctor.

Both the Army and Navy will procure the SINCGARS system for tactical communications. However, I understand that the two systems are not the same.

Mr. LATHAM. They are electrically the same in the air. They are not the same radio; that is correct.

What are we doing about this? Should we develop three airborne SINCGARS radios?

The answer is no. I have tasked the services to come back to me in the month of May and tell me why we have to have three completely separate development programs for SINCGARS' airborne radios. At this time each service has a separate development program planned.

Could we not have just one instead of three? How about just two instead of three? They will be fully interoperable. Why have three different manufacturers?

We are trying to get our arms around that.

Chairman GOLDWATER. Couldn't both services use the same system?

Mr. LATHAM. Yes, sir.

Chairman GOLDWATER. The same manufacturer?

Mr. LATHAM. They could.

Chairman GOLDWATER. What is the cost of these systems?

Mr. LATHAM. The unit cost on a SINCGARS radio, airborne, is estimated to be somewhere between $15,000 and $25,000 depending on production rate and whether you have gone sole source with one producer or not could influence cost. In round numbers I would say $25,000.

Chairman GOLDWATER. What are we talking in power output?

Mr. LATHAM. That radio is just a few watts output. They are probably 10-watt radios typically.

Chairman GOLDWATER. That is an awful lot of money to pay for that kind of radio.

Mr. LATHAM. That is right.

Chairman GOLDWATER. It is downright outrageous.

Mr. LATHAM. Today for a UHF ARC-164 radio of which we have produced 20,000 or more, you can get a brandnew one today off the production line with Have Quick for something like $7,000 to $10,000. That is what it costs today. These SINCGARS radios are newer, more sophisticated radios and will be produced at a lower production rate, and quantities.

They are projected to cost on the order of between $15,000 and $25,000. They are more sophisticated. They have a jam-resistant modem in them. We are trying to make the radio very reliable.

Chairman GOLDWATER. Did you ever think of asking the Japanese to get into this? It concerns me. I have a long background in communications. I can buy the most sophisticated equipment available for amateurs for $2,000 to $2,500, far more sophisticated in a lot of ways than what you are buying.

I can't understand why we should pay American manufacturers so much money for equipment and particularly so much money for research and development.

You and your constituents are doing most of the development. I won't say the research. This really bothers me.

Mr. LATHAM. It bothers me, too. I don't mean to make light of it at all. The prices we are having to pay for some of this equipment is exceptionally high. In some cases there is a very good explanation for it. In other cases you have to ask the question, why should that particular widget cost that much?

Believe me, we have asked a lot of hard questions about that. Sometimes there are very good answers. In other cases it is a little soft. In this particular case that is why I am looking at can't we drive these development programs together so that we get a high volume run on these radios and get the price down or at least have a competitive shoot-out between two manufacturers in some way and a leader-follower approach to keep the price down.

These radios run up in cost because you are only producing a few thousand of them and they are fairly sophisticated. As you put on very high reliability numbers and environmental conditions, they are going to cost on that order.

Chairman GOLDWATER. Have you ever gone to young people like the Silicon Valley young people around this country?

Mr. LATHAM. Yes, sir. In fact, we have some firms and others involved in producing some of our equipment and we have had a lot of problems with that.

The sophistication of a lot of this is such that only major manufacturers can bid and successfully produce it.

Chairman GOLDWATER. I disagree with you on that last one. I have seen too much development in communications.

What we in the armed services pay for communications equipment to me is probably the most inexcusable of all the high costs that we have.

Mr. LATHAM. Even with what these things cost, I showed you the result [deleted]. We have $100 billion, thereabouts, invested in the U.S. tactical fighter Air Force. We are talking, in terms of cost effectiveness here, of adding perhaps up to 4 percent, but it is like on the order of 3 or 4 percent can be attributed to communications cost associated with that fighter force.

When you look at the leveraging that we can get in terms of performance, if you consider the cost for no-jam resistant radios and for jam-resistant, that 4 percent is well invested even if the radio costs $25,000 or $30,000.

I will admit I hate to pay $25,000 for a little thing like that. You can buy a Cadillac for that amount today. Unfortunately, that is the way it comes out.

Chairman GOLDWATER. You use the argument of original cost of the equipment. That is no way to answer that anybody can understand.

As I look at this item by item on this committee, I tell you it is getting hard for me to support a lot of this equipment that I know we have to have.

I cannot understand American manufacturers not being able to make this special equipment cheaper. I cannot understand the tremendous time of research and development that any of our sophisticated communications companies have.

You know and I know that the cost of developing modern communications equipment doesn't come to these kinds of figures.

Mr. LATHAM. Yes, sir.

Chairman GOLDWATER. I sometimes wonder if we should tell these manufacturers we are not going to pay that price, if you want to sell it to us, you will have to come down.

We have to have it, I want to get back to that point, but paying the kind of money that we are putting out for simple communications equipment—let us say it is not simple.

Jamming is an old subject. The Germans do it, the Russians do it, we do it.

Mr. **Latham**. I can go to Great Britain. You can buy the equipment from a United Kingdom source; a SINCGARS-like equipment, or go to France and do the same thing. They are however, all about the same price.

Chairman **Goldwater**. I grant you that.

Mr. **Latham**. I don't know how to get some of these costs down excepting to have high volume and stiff competition.

In the SINCGARS case, the intention is to buy some 300,000 of those over a period of years. The ITT who is the prime contractor has been tasked by the Army to bring a second source onboard as rapidly as possible.

Then we are going to compete primary source and second source in a leader-follower arrangement to try to drive that price down. In fact, what ITT has done is open a new factory to produce this radio in a very highly automated fashion to try to bring the cost down.

There is no simple answer why the radio costs that much. The plain SINCGARS, the ground version, is on the order of $10,000 or $12,000 in production.

Chairman **Goldwater**. I won't say any more about it. This is just a personal gripe with me. It is also a personal gripe that we have the Army, Navy, and Air Force having to buy two different systems to do the same thing.

Mr. **Latham**. They may not after we have the shoot-out in my office.

Senator **Bingaman**. I think this is our last tactical hearing and I want to bring this up. If you can't answer it, just say so and I will try to get someone who can.

DRONE AIRCRAFT

There is something in "Newsweek" this week where they have our science advisor, George Keyworth, saying:

> We are developing a cheap $50,000 drone aircraft that could distinguish a Soviet tank from an allied vehicle by means of an optical homing device and an advanced computer-guidance system; once identified, the tank can be destroyed with nonnuclear high explosives.

I just wonder if you have any knowledge or opinion on this?

I believe we are finishing our tactical hearing and there has been nothing about this.

Chairman **Goldwater**. We had a few words on it yesterday.

Senator **Bingaman**. This seems like an amazing cost breakthrough to me. For $50,000 to be able to get a drone that will do all of this. They indicated here that this will be able to defeat any effort by the Soviets to invade Europe.

Would you have any thoughts on this or knowledge of it?

Mr. **Latham**. Yes, sir. [Deleted.]

Senator **Bingaman**. So that you know, this is this week's issue of "Newsweek."

Mr. **Latham**. I read that.

Chairman **Goldwater**. I think it would be worth your while to discuss this with the doctor, also you might visit some of the places where it is being developed.

[Deleted.]

Senator BINGAMAN. For $50,000 you can get one drone for two radios.

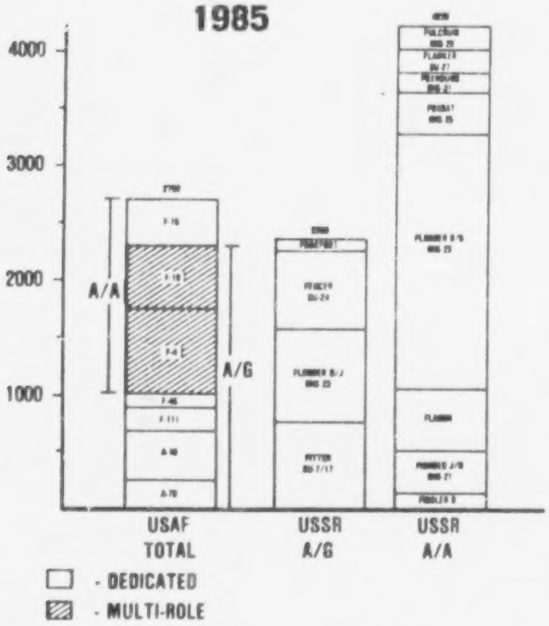
Mr. LATHAM. [Deleted.]

ELECTRONIC COMBAT

Let me talk about this area of electronic combat because this brings up a number of very interesting problems in our interoperability and jointness and tactics.

Let me show you here a rather interesting table comparing Soviet and United States fighter aircraft and what we are going to have in two timeframes.

FIGHTER FORCE COMPARISON



[DELETED]

Here is 1985, here is 1995. In the Air Force, for example, here is our air-to-air capable aircraft and air-to-ground.

In the case of the F-16 and F-4 those are multirole aircraft.

Here are the Soviets today, air-to-ground and air-to-air. In the center are inventories of these aircraft. As you know, he has us outnumbered. In the 1995 timeframe he has continued to grow and put additional aircraft in.

What is more important is not just the numbers, but the modernization of these airframes into the new airplanes.

Here is a comparison of United States and Soviet fighter fire control systems. There is a very ominous message here that I would like to bring home to you and it brings back the interoperability issues, and so on.

[Deleted.]

Chairman GOLDWATER. Doctor, I have some questions, but time is of the essence. I am going to submit these to you.

Mr. LATHAM. Yes, sir.

IFF

Chairman GOLDWATER. IFF to me is one of our most important subjects. The inability for us to come to some agreement with the Germans, I cannot understand. You know we have had trouble with IFF since it was invented. It has never been as dependable as it should be.

Mr. LATHAM. I will be glad to discuss that with you. We are in a logjam with the Germans, as you say, between what they want to do and what we want to do.

What is not realized is if the Germans do opt for the different frequency band, they are going to have to retain the current IFF in their aircraft to talk to the civil world.

Our IFF's are not new so they are compatible with that so we can still interoperate with the Germans, admittedly on the MK-12 only.

Chairman GOLDWATER. The frequency we argue about is the frequency they originally wanted. The United States never really said they wanted to move to the E/F band. They said they were not going to sign until they did cost analysis and looked at the benefit problem.

They found out it was almost twice as expensive and they didn't gain that much in performance in most cases.

In some cases they didn't gain any performance.

Chairman GOLDWATER. What frequency are we looking at?

Mr. LATHAM. Frequency for the new MK-15 is the exact same frequency we are using today in MK-12 which is the L band. We have two slots in the L band range which has been allocated for 20 years or better to IFF.

It is in the exact frequency range we want to use for the new MK-15. The Germans want to [deleted].

[Chart deleted.]

This is a wiring diagram to show you what [deleted].

Chairman GOLDWATER. What are the plans for the SR-71?

Mr. LATHAM. The plans for the SR-71 in wartime is [deleted] role. It is our only aircraft that we feel can be used in a [deleted] if we have to.

Today it only does [deleted].

Chairman GOLDWATER. I was told this is the Soviet system.

Mr. LATHAM. This is the Soviet system. This is what they have done to wire up their command and control system. This presents us with an interesting possibility for [deleted]. We are working on that right now.

Again, we are talking about that off line.

Senator DENTON. What can you say about AWAC's communications with fighters and ground units?

Mr. LATHAM. The [deleted].

That has great potential for coordinating the air-to-air battle as well as air-to-ground.

[Chart deleted.]

Now, the Soviet advances in aircraft warning and countermeasures are summarized here. [Deleted] expendable and have [deleted] systems.

AREAS OF SOVIET ADVANCES—AIR-TO-AIR WARFARE

Fighters and fire control systems. Air-to-air missiles. Warning and countermeasures. Command, control and communications.

In the area of air-to-air warfare they have new fire control systems that I have summarized. They have [deleted] in their new system and they have greatly improved their command and control communications capability in support of all of that.

Chairman **GOLDWATER**. Let me get back to one point.

You mentioned earlier about the improvement of the [deleted] radar.

Are you sure of that?

Mr. **LATHAM**. Yes, sir. [Deleted.]

Chairman **GOLDWATER**. [Deleted]

Mr. **LATHAM**. Yes, sir. [Deleted.]

Chairman **GOLDWATER**. Is it a [deleted] radar?

Mr. **LATHAM**. [Deleted.]

Chairman **GOLDWATER**. Their history from what I know has not been all that good.

Mr. **LATHAM**. I am glad you brought it up. Let me tell you what is going around town and it is a myth. There is a myth around town that says the Soviets are technologically behind us in SDI. That is not true.

There is a myth around town that their tactical equipment is inferior to ours. In point of fact, the equipment they have, [deleted].

Chairman **GOLDWATER**. You are sure of that?

Mr. **LATHAM**. [Deleted.]

Chairman **GOLDWATER**. I would like to see it.

Mr. **LATHAM**. [Deleted.]

Chairman **GOLDWATER**. [Deleted.]

Mr. **LATHAM**. We can certainly show you that. It is [deleted].

Chairman **GOLDWATER**. Check with my staff.

Mr. **LATHAM**. What is happening, both on the blue side and red side, is summarized here. Range, speed and coverage.

What we are seeing is the evolving battlefield becoming more mobile and deception being employed, use of precision guided munitions, incredible sensors on aircraft that can resolve targets at night and in any weather and produce images of those targets at great ranges.

ELECTRONIC COMBAT

Addresses the capability to target, disrupt, deceive and exploit hostile electromagnetic equipment and systems.

Includes: Self-protection; escort/stand-off jamming and C^3 countermeasures; Tactical surveillance/electronic support measures; lethal and non-lethal techniques.

In the world of electronics combat that we are addressing, it includes these kinds of functions, self-protection, escort, stand off jamming, surveillance systems and lethal and non-lethal measures.

We are calling that collection of capabilities, electronic combat. By looking at what the Soviets have done in this area in the past 10 years, we see that the Soviets have deployed [deleted].

They have begun deployment of [deleted].

The sophistication of all this drives you toward something I call improved laboratory simulation. You can't do all this without very sophisticated tools to help put this together, simulate and work out tactics and things of that nature to see how you are going to use this in the real world situation.

In the Green Flag Exercise series the allies are participating using hundreds of aircraft and real jammers on the air. We are starting to do more of it in real live exercises, but it is very difficult.

I have coined a term durable electronic combat systems [DECS]. First of all, DECS has enormous combat potential, if you can put all this together. The services are looking now to integrate active electronics, passive systems combined with lethal techniques to fight the next war.

About 1½ years ago I asked then General Creech and General Richardson if they would put together a special team of people to work joint command and control tactical problems. They did put those teams together. They have been working hard down there, 50 or so people coordinating with the staffs up here.

They have a very interesting set of briefings on how they can fight this war in a joint way in a real time. It is beginning to come together.

The last item says that resources are inadequate in the service POMS. I think we will have to put more resources in this. What are the objectives we are trying to achieve?

DURABLE ELECTRONIC COMBAT: ONE VIEW

Enormous combat potential. Mandates intimate and new joint/cross-service operations and tactics. Requires new command, control and information assessment capability: Real-time combat information/intelligence survivable/assessment planning and weapons coordination centers; "real-time" war. TAC/TRADOC and JRMB working the problem: C^3; joint operations; weapons. Resources inadequate in service POMS.

We are trying to fight and win in a very demanding electromagnetic environment.

[Deleted.]

AERIAL WARFARE

Aerial warfare. We believe most kills have and will continue to be made on [deleted] targets. What you have to do in today's modern air combat is provide situational awareness. That is more than just voice tell. It is passing high-speed data from whatever set of sensors you have, either on other aircraft or on ground.

The future conflict will be characterized by the things I have shown here. A lot of this so-called electronic combat stuff at longer ranges.

The United States and the allies, one way we can counter that numerical threat I showed you is to have no first-shot advantage by him using a [deleted] system.

We have to make better use of [deleted] techniques in the active force and use long-range arms against some of his threat.

Senator DENTON. You say approaching qualitative equivalence.

I was getting the impression you were trying to present the point of view that they had passed that.

I was at a meeting on EW in San Francisco 2 years ago and there was nothing like that.

Mr. LATHAM. Today, 1985, they don't have that many 27's, 29's, 31's. In 1995 they will have a lot of them out there. It is approaching today and passing as time goes on.

The conclusions I have reached in looking at this electronic combat area is that we must have weapon systems that [deleted] and [deleted].

Those are the things we have to do. That presents some very interesting problems in command and control. We have to operate effectively in that projected threat environment.

You are going to have integrated mobile sensors, fire control systems, exploitation denial, and do on-board and off-board fusion data. That means on the F-15 we are going to be feeding that guy with information developed from on-board sensors and off-board sensors.

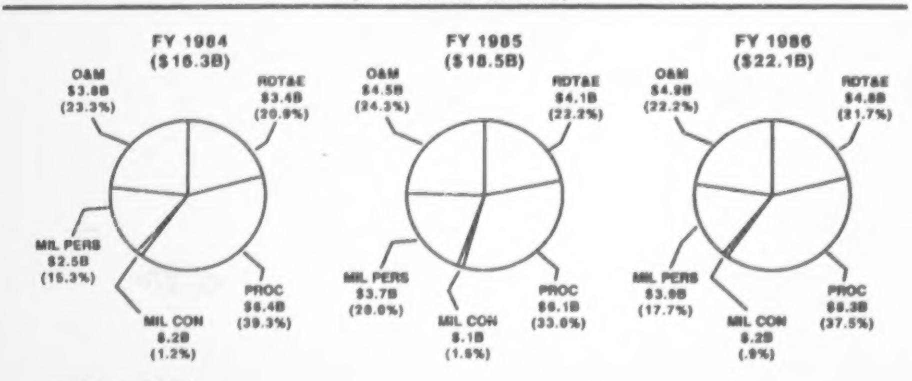
It will have to be put together in a way that the back seat operator of that F-15 can make sense out of it and use it immediately.

[Chart deleted.]

Let me show you the resource request. If you look at joint programs, 65 percent of the C^3 budget is joint cross service or allied programs, 65 percent roughly is in that category.

I have a problem trying to put together all these programs each year because sometimes they all aren't funded properly.

C^3 RESOURCES
BY APPROPRIATION
(TOA - $ IN BILLIONS)



PRES.'s BUDGET
FEBRUARY 1985 DOD FYDP

If we look at the budget request for 1986, I am asking for $22.1 million in C^3.

The intelligence request is still another number. [Deleted.]

I am asking for a lot more in my budget request than the overall defense budget. You have been very, very good about supporting me. In the last 4 years we have done much better than the average in the defense budget in the C^3 area.

In electronic combat, $2.7 billion, 13 percent of the budget; strategic, $5.2 billion, 24 percent of the budget; theater tactical is another $4 billion; navigation and warfare, $3.4 billion, $22.1 billion altogether. I think we can justify that $22.1 billion.

A C³I ASSESSMENT

Priority recognized: Defense guidance in NSDDs. Excellent budget support: Within DOD; by Congress. Modernization program defined/underway. A survivable and enduring C³I system will: Strengthen/stabilize deterrence; provide flexible escalation control; permit tradeoffs vis-a-vis added weapons; assist arms control initiatives. However: the initiatives underway are: Not all that simple; will take time; require sustained support.

We have excellent budget support, as I mentioned, by you and within the Department of Defense Resources Board which I sit on and the services out here that support us have been very good about it.

The modernization program at the tactical level and strategic level is finally underway. I think we can move a number of things in the conventional tactical area faster than they are being moved.

In the strategic side, but also applicable to the tactical side, surviving and enduring C³I systems can do these kinds of things.

At the conventional level as well as strategic level provides better flexibility for the commander, trade-off for weapons as we noted and in fact in the strategic sense assist arms control.

Last, however, it is not that simple. It will take time. I don't get the first Milstar on order until [deleted]. I don't get the full Constellation up until [deleted]. It takes time for many of these things to materialize.

Last, I want to give you a couple words from our friends.

This is something Mr. Brezhnev said. Anything goes is what he said.

ON SOVIET BEHAVIOR

"We may recall Lenin's words that in our society all is moral that serves the interest of building communism."—L.I. Brezhnev, 1976 Report to the 25th Congress of the U.S.S.R. Communist Party.

Last is a message that says by 1985 they will be able to do anything they want.

"Trust us comrades, for by 1985 * * * we will have achieved most of our objectives in Western Europe. We will have consolidated our position. We will have improved our economy. And a decisive shift in the (balance) of forces will be such that come 1985, we will be able to exert our will wherever we need to."—Leonid Ilyich Brezhnev.

[The prepared statement of Mr. Latham follows:]

PREPARED STATEMENT BY DONALD C. LATHAM, ASSISTANT SECRETARY OF DEFENSE (COMMAND, CONTROL, COMMUNICATIONS, AND INTELLIGENCE)

I. INTRODUCTION

Mr. Chairman and Members of the Committee. It is my privilege to appear before you today to discuss a critical and an indispensable component of our military organization: Command, Control, and Communications, or C³ ("C-cubed"). Without the capabilities that properly designed C³ systems provide, our forces cannot be effectively utilized.

My presentation will focus on C³ interoperability and electronic combat because of your expressed interest in those topics for today's hearing. Lieutenant General

McKnight will address C^3 lessons learned from Grenada as well as his point of view on interoperability as Director for Command, Control and Communications under the JCS. The other witnesses for today's hearing will be addressing electronic combat in detail so I will not spend a great deal of time on specifics of those programs but will address the more macro problem of joint, integrated, electronic combat operations as they impact C^3I. I will also address the very substantial progress we have made in improving our C^3 systems and our stewardship in the management of the fiscal resources appropriated by the Congress, emphasizing fiscal year 1986 and outyear programs which are being undertaken to reinforce the capabilities and survivability of our C^3 systems. I will not be discussing intelligence programs, per se, however, the information and capabilities provided by them play a major role in achieving an effective command and control capability. I can assure you that we address them as a system package in support of all of our forces and the National Command Authority.

II. COMMAND, CONTROL, COMMUNICATIONS, AND INTELLIGENCE (C^3I) MANAGEMENT

In the DOD Authorization Act of 1984, the Congress directed establishment of an Assistant Secretary of Defense (C^3I) who shall have as his principal duty the overall supervision of DOD C^3I affairs. Secretary Weinberger has reorganized the Office of the Secretary of Defense so that all C^3I and related space systems matters are being transferred from the Under Secretaries for Policy and Research and Engineering, to the ASD(C^3I), who will report directly to the Secretary. This consolidation of all C^3I functions under one individual will ensure consistency of DOD C^3I policy development, resource management, and program evaluation, as Congress directed. This realignment coupled with prior Secretary of Defense initiatives to improve our strategy and policy formulation processes, strengthens the Planning, Programming, and Budgeting System (PPBS), provides for greater participation of the CINCs in our prioritization efforts, and improves our acquisition management efforts. Also transferred to the ASD(C^3I) were direction, authority, and control over the Defense Mapping Agency, Defense Communications Agency, and the Joint Tactical C^3 Agency, and primary staff supervision over the Defense Intelligence Agency and National Security Agency/Central Security Service.

III. C^3 POLICY OBJECTIVES AND REQUIREMENTS

To be successful, our C^3 programs must provide the means to transform individual strategic and tactical units into an integrated, effective force. These programs must satisfy the needs of all echelons of our forces to observe, provide warning and assess adversary intentions, collect and process information on the status of our own and hostile forces, support decision-making, and communicate commanders' decisions to the forces. The challenges of the C^3 mission are intensified by the fact that our basic national security policy is one of deterrence, which requires that we sustain a capability to react quickly and effectively after the enemy has taken the first initiative should deterrence ever fail.

Our C^3 programs are aimed towards (1) building a more surviving and enduring C^3 system capable of supporting the forces from peacetime through any level of conflict; (2) correcting existing deficiencies in response to emerging threats and to take advantage of new technologies; (3) undertaking new C^3 initiatives to build on our existing C^3 capabilities so as to meet new mission needs more effectively; (4) enhancing the readiness of our strategic and tactical forces in balance with needed upgrades for mobility, interoperability, and sustainability; and (5) strengthening our backbone telecommunications networks.

The following is a brief summary of steps we have taken to improve interoperability followed by a summary of the electronic combat mission area, both of which areas were requested to be emphasized for this hearing. Following those areas I will address each of the remaining C^3 mission areas, highlighting the status of our key objectives and programs. Some of the programs I will discuss under the general topic of interoperability, I will also cover in the C^3 mission areas to emphasize activities funded by the current budget request.

IV. INTEROPERABILITY

I am pleased to see that this committee has taken such a strong interest in interoperability. It is an important and difficult issue; one that I can report we have been attacking vigorously at every level.

While I am sure that each of you has an intuitive feel for what interoperability means and in many cases, personal experience, I would like to define the term precisely, in its military sense, in order to set the stage for my discussion. Interoperability is "the condition achieved among communications-electronics systems or items of communications-electronics equipment when information or services can be exchanged directly and satisfactorily between them and their users." (Reference: JCS Pub 1) Please note that the inclusion of "users" implies that procedures, doctrine, planning, training and user definitions of words and data are as important to interoperability as electrical and physical parameters of the equipments employed as a media. Interoperability is often confused with compatibility which is defined as "the capability of two or more items or components of equipment or material to exist or function in the same system or environment without mutual interference." (Reference: JCS Pub 1)

An important observation is that we do not need nor can we afford 100 percent interoperability in all categories of equipment. In fact, many of our most difficult issues in this area relate to identifying the level of interoperability sufficient and necessary for a particular system and its foreseen applications. That tough job falls to the CINCs and the Organization of the Joint Chiefs of Staff (OJCS) in the development and approval of Required Operational Capabilities (ROCs).

The need for interoperability has increased sharply, given the demands to meet the threat with Joint-Service and even multi-national forces organized into a cooperative, effective, synergistic whole. The challenge of providing it is made more difficult because we will be operating in a high technology environment and facing an adversary who will attempt to confuse, disrupt and destroy any command and control or communications systems. Additionally, we cannot afford the luxury of unnecessary duplication or expenditure of equipment, effort and other resources that can occur when interoperability is not given adequate consideration. In recognition of these fundamental requirements, we have been actively pursuing efforts to identify and ensure sufficient interoperability.

Interoperability is being given the highest level of attention within the Department of Defense. Secretary Weinberger, in his Fiscal Year 1984 Annual Report to the Congress, described the importance of C^3I and listed four initiatives to enhance our ability to manage, procure and operate C^3I systems. One of the initiatives was increased stress on interoperability, both inter-Service and with our allies. He highlighted interoperability again in the FY 1985 Annual Report when he stated, "Interoperability of C^3I systems among the Services and between U.S. and allied forces is another key consideration." In this years report for FY 1986, speaking of C^3I, he states, "Our primary goal is to provide C^3I systems that maximize the performance of our weapons systems and the operability of our forces in terms of survivability, endurability, interoperability, and effectiveness."

In his annual report to the Congress on "Standardization of Equipment Within NATO," Secretary Weinberger has consistently highlighted the importance of interoperability with our allies. For example, in the January 1985 report he states, "Integrated or at least interoperable command, control and communications (C^3) are central to effective conduct of Alliance air defense."

To improve our ability to manage C^3I, including interoperability, within the Department, we have made some organizational changes in addition to the consolidation of responsibilities under the ASD(C^3I). I am confident that these steps will significantly improve Joint and Combined C^3 interoperability.

On July 5, 1984, the Joint Tactical Command, Control, and Communications Agency (JTC^{3}A) was chartered by consolidating existing organizations. It has a timely and vital role in resolving interoperability issues. Its mission is to ensure the interoperability of tactical C^3 systems for joint or combined operations (including non-strategic nuclear forces) through the development and maintenance of a joint architecture, interface standards, and interface definitions for tactical/mobile C^3 systems. System developers will use the JTC^{3}A products as "road maps" to fulfill interoperability requirements.

The Joint Interoperability of Tactical Command and Control Systems (JINTACCS) program, which will continue under the new JTC^{3}A, has made significant progress in developing message text formats (MTF), messages that are machine readable while still allowing automatic machine processing of specified data contained in them. The Agency is also tasked to attack bit-oriented formats, messages which are intended for computer-to-computer communications only. The MTFs will undergo operational effectiveness demonstration (OED) this year. Providing standard, machine readable formats contributes to interoperability by allowing automated processing of real-time critical data elements that have joint standard definitions. A strong testing and configuration management program is taking shape to ensure adherence to the approved standards. A testbed for JINTACCS MTFs is in place at Fort Monmouth and we are developing a testbed co-located with the Navy at NOSC in San Diego, for testing of the Tactical Digital Information Link for the Joint Tactical Information Distribution System (JTIDS) (TADIL-J). By 1990, we intend to consolidate those two testbeds with the Tri-Tac testbed at Fort Huachuca. That facility will then become the primary interoperability testbed for the JTC³A. JINTACCS efforts include representation of the U.S. in parallel NATO efforts such as LINK 11 and LINK 16.

The JTC³A will be deeply involved in the operational effectiveness demonstration (Solid Shield 85) of JINTACCS MTFs and initial implementation of the MTF standards by the Services in 1986. The JINTACCS program will also continue development efforts for TADILs, including configuration management testing related to the Joint Tactical Air Operations (JTAO) TADIL and support for Allied efforts on MTF messages in the tactical functional areas. Funding for the JINTACCS program includes integration into approximately thirty tactical C³ systems, as well as comprehensive testing, to insure that automated tactical command and control systems achieve and maintain interoperability. This includes a major software configuration management effort. Total Service system effectiveness is demonstrated periodically in joint exercises such as Solid Shield 85, which will take place this spring. Documentation is provided and training conducted as this new DOD-wide set of standards is being introduced into service. Total Service and Agency FY 1986 funding requested for JINTACCS, including TADIL-J, is approximately $104.8 million. The agency will initially continue the previous Joint Tactical Communications Office (JTCO) and Joint Test Element (JTE) Tri-Tac responsibilities, including those previously outlined, and transition that program to the Services over the next few years.

Initial interoperability efforts of the JTC³A have focused on achieving early user capability and immediate assistance to the Commanders of the Unified and Specified Commands. Since its establishment, the agency has been actively working with the CINCs to identify solutions to several C³ problems in the near term. Additionally, it has begun efforts working toward the long-term tactical C³ architectures that will become the road maps for evolving C³ systems. Though we cannot expect immediate solutions to all the existing challenges of such a complex issue, I expect to see increasingly significant improvement in tactical C³ interoperability as a result of the formation of the JTC³A.

Some time ago we recognized the need for close coordination between the Office of the Secretary of Defense (OSD) the OJCS and the Services for timely resolution of C³ issues. We established three management bodies to effect that coordination: the C³ Executive Committee (EXCOM) consisting of the Deputy Secretary of Defense and the Chairman of the Joint Chiefs of Staff to make recommendations to the Defense Resources Board on the allocation of resources to C³ programs; the C³ Review Council, chaired by the ASD(C³I) and including senior C³ OJCS and Service members, is the primary support arm of the EXCOM for C³ matters, including interoperability; at the functional level, eight panels, chaired by senior military officers and civilians, assist the C³ Review Council in specific functional areas with each panel addressing interoperability within its functional area.

In addition to joint forums, there are international bodies addressing the problems of interoperability. Within NATO, for example, the Allied Data Systems Interoperability Agency (ADSIA) and the Tri-Service Group on Communications and Electronics Equipment (TSGCEE) are responsible for certain aspects of combined interoperability. The JTC³A assists in representation in these bodies as does the Defense Communication Agency (DCA). Representatives are also drawn from the OJCS and OASD(C³I) to present coordinated U.S. positions. The C³ Review Council and its functional panels ensure that U.S. positions are fully coordinated.

Recent publicity may have caused concern that, despite its position as a major initiative, interoperability has not been given the attention it deserves. However, the problems which were discussed arise from decisions made many years ago on systems that, for the most part, are already fielded. Modifications to achieve additional modes of interoperability at such a late date can be very expensive and must be weighed carefully against expected benefits. It is in the area of future systems that we are making the most progress toward sufficiency in interoperability.

V. C³ INITIATIVES

Satellite communications links have been discussed in this committee recently and I would like to turn to them now. In the extremely-high-frequency (EHF) satellite world we are developing Milstar and incorporating maximum interoperability. We have selected a common vocoder device for voice communications on Milstar to ensure full interoperability for all voice communications. For teletype and low data rate users [deleted]. To provide interoperability between strategic airborne and ground users. [deleted]. As a result, strategic airborne and ground users will have terminals equipped with [deleted] to ensure direct interoperability. [deleted]. We believe this approach achieves an unprecedented degree of interoperability for all Milstar users.

In the super-high-frequency (SHF) satellite systems we do face some difficult challenges. The Defense Satellite Communication System (DSCS) ground mobile forces (GMF) Tactical Satellite Communications (TACSATCOM) terminals initially being produced for the Army will be able to interoperate with Air Force terminals in one of two ways. Interoperability can be achieved when several circuits are combined at the Air Force terminal's Low Rate Multiplexer (LRM). At the Army terminal the combined circuits (called a "group") must currently be routed through a Tri-Tac multiplexer and crypto to be broken back to individual circuits. That requires colocating a Tri-Tac equipment with the Army terminal. Another method is to route the "shot" through a ground based "gateway" which could even be an Army and colocated Air Force terminal operating back-to-back. That method requires double usage of the satellite. For FY 1986–1988, the Army has requested/programmed roughly $30 million for LRMs and additional funds for cryptos to upgrade their initial production terminals to significantly improve utilization of satellite capacity. That will then allow direct interoperability with Air Force terminals. This is one example of an area that the JTC³A has been investigating for near term initiatives to improve interoperability. They recently presented me with a recommendation for accelerating direct interoperability of Army and Air Force terminals. I have asked the Army to examine the programmatic and funding impacts of that recommendation and report back to me as soon as possible.

Another [deleted]. To achieve interoperability, [deleted].

Jam resistant, secure radios create another technical challenge to interoperability. For very-high-frequency (VHF) FM voice we have total agreement between the Services on the Single Channel Ground and Airborne Radio System (SINCGARS). While there is less agreement with our allies, an interoperability mode is currently being discussed. At the levels these radios will be used, full interoperability may not be cost effective since exchange of liason teams is envisioned. It is not deemed practical to develop an "allied" VHF tactical radio which can accomodate several different allied notions on how to achieve jam resistant communications.

SINCGARS will satisfy our very high frequency secure anti-jam requirements and replace the aging AN/VRC-12 family of radios. Currently we are reviewing the planned efforts of the Services to determine if a cooperative development effort between the Army, Air Force, and Navy for the airborne version can be accommodated despite the slightly differing operational requirements. It is my judgment that a single, or at most, a dual development program is sufficient and that we cannot tolerate three separate airborne SINCGARS development programs. Production of the ground version has started with the initial Army Division to be equipped by 1987. The Army has initiated action to obtain a second SINCGARS production source by the end of 1986. Our budget request for $231.3 million will procure 16,400 radios in FY 1986. An additional 84,125 radios are planned for procurement at a cost of $1.4 billion in FYs 1987–1990.

Because of the importance of Line-of-Sight (LOS) voice communications in conducting air combat operations and the widely varying ECM threat scenarios which must be considered, the Air Force has given top priority to the development of flexible and fully responsive AJ voice radios in the military ultra-high-frequency (UHF) band. The first system to be fielded was Have Quick which was an inexpensive, frequency hopping modification to inventory UHF radios to provide a measure of ECCM for critical UHF voice communications until a more capable and robust, long term system could be developed. The majority of our major allies and all our Services have "signed up" to the Have Quick. A series of improvements is planned for Have Quick and they are collectively referred to as Have Quick II. They will include the number of frequencies for hopping, refining the secure voice interface, improving the Comsec key fill mechanism, increasing the preset channel capability and increasing radio output power.

Consistent with the improvements to our VHF and UHF communications systems, we are pursuing jam-resistant improvements to our tactical HF radios. [deleted].

To provide the needed capability beyond 1990, an improved, more robust, AJ standard is being identified. A working group has been formed under the direction of the JTC³A to develop the HF AJ standard of the future. All the Services are cooperating in that effort. Our goal is to define the advanced standard by second quarter FY 1986 so that it can be incorporated into the Navy's HF AJ program. The Navy's program will develop and acquire an AJ HF communications system to meet tactical battle group, tactical support and strategic connectivity needs for surface ships, aircraft, communication stations ashore, submarine and for two-way tactical support links between the P-3 aircraft and anti-submarine warfare operations centers. The system will also satisfy additional requirements for EAM delivery, SSBN report back and force reconstitution. $40.3 million is requested to enter full-scale development in FY 1986. Fleet introduction is currently planned for 1992.

Effective data distribution is a key aspect of our C^3 architecture. To provide for reliable and survivable data communications, the Joint Tactical Information Distribution System (JTIDS) is being developed to provide a high-capacity, secure, jam resistant, digital information exchange system for a wide variety of tactical forces. JTIDS capabilities include [deleted]. The Air Force is developing JTIDS terminals for Army and Air Force use while the Navy is developing JTIDS terminals for Navy and Marine Corps use. All JTIDS terminals will be interoperable in the TDMA mode for both voice and data. JTIDS RDT&E funding requested for FY 1986 is approximately $255.8 million. Included in that funding is continued Full Scale Development (FSD) for both the TDMA and DTDMA systems. [Deleted.] The Services have programmed approximately $900 million for JTIDS equipment procurement through FY 1990.

The Air Force is developing a very highly jam resistant voice radio called the Enhanced JTIDS System (EJS). This system will provide [deleted]. The system capitalizes heavily on the use of JTIDS technology and [deleted]. EJS will be designed for installation on such space limited platforms as the F-16, and [deleted]. We have requested approximately $108 million of RDT&E in FY 1986 to continue development of EJS. An EJS equipped platform will interoperate directly, [deleted]. [Deleted] with a TDMA or DTDMA equipped JTIDS platform.

In the world of switched communications we have developed the Tri-Tac switches which are fully interoperable and end-to-end secure. The majority of Tri-Tac equipments developed under the Tri-Tac program are in production, and delivery of several items to the field is underway. Delivery of the large circuit and message switches [deleted]. Delivery of the AN/TRC-170 tropo radio and the Digital Group Multiplexing (DGM) equipment [deleted.] Tri-Tac equipment in production includes: the Communications Nodal Control Element (CNCE), Tactical Digital Facsimile, Net Radio Interface, Short Range wideband radio, Digital Non-Secure Voice Terminal and [deleted]. This year we expect to award production contracts for the Unit level Circuit Switch, Lightweight Digital Facsimile (LDF), Mobile Subscriber Equipment (MSE) the Single Subscriber Terminal and the Advanced Narrowband Digital Voice Terminal. The LDF and MSE are Tri-Tac items being procured on a non-development item (NDI) basis. Additionally it appears that the Modular Record Traffic Terminal (MRTT) will also be an NDI candidate in FY86. RDT&E continues on the AN/GYC-7 Unit Level Message Switch (ULMS), the Communications System Control Element (CSCE), upgrading the Tri-Tac AN/TTC-39 circuit switch and providing [deleted]. The procurement request for these Tri-Tac equipments in FY86 is $853.0M, and $7.5 billion for FYs 1987-1990.

Of this amount, $335.3M is required in FY 1986 and $3.8 billion in FYs 1987-1990 for the Mobile Subscriber Equipment (MSE) program. The MSE is a tactical communications system which is expected to provide mobile (radio) and stationary (wire) subscribers with automatic voice and data telephone service. The closest thing to it in the civilian world are the cellular radio/telephone systems now being marketed for use in automobiles. MSE will replace the existing mix of switches, radios, cables, and telephones that now makes up the Army's tactical switched communications system at Corps and Division levels. It will also take the place of some equipment developed through the Tri-Tac Program that was originally planned for deployment at the Corps level.

The Army has had a long standing requirement for a secure, automatic, mobile subscriber, discreet address telephone system at Division level. Recent approved changes in battlefield doctrine in response to the threat and advancements in technology have caused the Army to expand its requirement for MSE to include the Corps level and to accelerate the acquisition. Based on a survey and analysis of this requirement and available mobile communications technology, it has been concluded that the MSE Program can be competitively acquired on a non-developmental item (NDI) basis. This will alleviate a potential lengthy and costly development cycle and result in fielding equipment 4-6 years sooner. Further the introduction of the MSE system will permit the Army to realize substantial cost and personnel savings.

The Army's battlefield communications review concluded that both the mobile radio equipment of the French Rita system and the Single Channel Radio Access Program of the British Ptarmigan System could satisfy the basic MSE requirement.

U.S. companies have teamed with respective French and UK firms for this competition. GTE has teamed with a French company (Thompson-CSF) which manufactures the Rita System and Rockwell-Collins is teaming with ITT (Defense Communications—Nutley, N.J.) and Plessey Corporation of the United Kingdom. The latter company produces the so-called Ptarmigan System. In both cases it is the U.S. firm which will be the prime contractor. We expect that a significant percentage of the system chosen will be produced in the U.S. However, the selection and use of foreign equipment and technology as part of the MSE should not only improve U.S./NATO communications interoperability, but will send a much needed message to our Allies of our willingness to consider equipment of foreign design which meets U.S. requirements.

The request for proposals for the MSE was issued in July 1984. Contractor proposals were received in October 1984. The proposal evaluation process is presently underway and a contract award is scheduled in May 1985. Prior to proceeding with a contract award, the Army will brief OSD and members of the Congress on their specific plans.

Moving to strategic C^3 developments, there was often a perception in the early days that due to the critical nature that strategic C^3 assets played in our national policy, the communications as well as command center decision-making aids should be optimized to a specific facility and its mission. This resulted in many unique communications and C^3 facilities. Optimization had been achieved at too low a level with a resulting degradation in top level capability and interoperability when all the pieces had to work with each other. We have been working to redress that situation since the initiation of the Worldwide Military Command and Control System (WWMCCS) and the WWMCCS ADP computer replacement programs. The incompatibilities between systems and communications interface problems coupled with cumbersome and often nonstandard operating procedures are rapidly becoming a thing of the past. This realization of the absolute necessity for interoperability and uniformity of procedures and operating instructions is not new, but continual attention at the highest levels in the Department and the Services has borne significant results in the recent past.

As a result of joint Service efforts, the Department and our strategic C^3 system have benefited in numerous ways. The beneficial aspects become of increasing importance as we view the operational benefits that accrue when one postulates the changes in operational concepts, mission planning, tactics and communicatioons connectivity which are necessary as both forces and supporting C^3I are lost, reconstituted or reconfigured. As alternate command centers, communications facilities and links assume new roles or intermediate facilities become inoperative, there is a need to retain absolute, positive, civilian control. Via judicious planning, operational practices and message sequencing and accountability schemes, "choke points" can be avoided even in a highly stressed environment.

People are critical to interoperability also. As we field ever more complex systems, training of the users also becomes more important. Toward that end, we are placing significant emphasis on training for the use of these new equipments and standards. For example, an important part of the current JINTACCS effort is the preparation of training materials for the upcoming OED and follow-on operator training by the services. Another important training effort is the Joint Operational Interface Simulation Training System (JOISTS). USREDCOM is developing the Required Operational Capability (ROC) for this system which will provide Joint Tactical Air Operations system training to personnel at all echelons of the joint air command and control structure.

VI. C^3 RESOURCE SUMMARY

We manage all the C^3 programs within a mission area structure, which helps us achieve a better overview and integration of the various C^3 systems and the forces or weapons systems they support. Each mission area consists of a group of programs mutually dedicated to address specific C^3 objectives. In fiscal year 1986, the budget request for C^3 programs is [deleted]. Interoperability crosses mission areas. Electronic Combat, which follows, is, however, one specific mission area. I will highlight important programs in this area and discuss the resources we are applying to them.

VII. ELECTRONIC COMBAT

Electronic Combat addresses the capability to target, disrupt, deceive, and exploit hostile electromagnetic equipment and systems, while retaining the use of the electromagnetic spectrum for friendly forces.

Electronic Combat includes the coordinated use of (1) self-protection jamming, (2) escort, standoff, and C^3 countermeasures, (3) tactical surveillance and electronic support measures, and (4) lethal and non-lethal techniques.

[Deleted.] Therefore, we are developing [deleted]. More advanced techniques are under development to counter projected enemy advances in laser and electro-optic tracking systems.

The major electronic combat efforts underway today are directed toward updating current assets to keep pace with a rapidly changing and expanding enemy threat, and continuing the emphasis on joint programs to maximize return on investment and reduce unnecessary duplication.

In the area of self-protection jamming we are continuing to make improvement in the performance and quality of our on-board systems for tactical aircraft. The major new system development is the Advanced Self-Protection Jammer (ASPJ). The ASPJ is in the final stages of development, and represents a major step in the employment of a common ECM system for both Air Force and Navy aircraft (F-16, F-18, AV-8, F-14, A-6E). First deliveries of the ASPJ are planned for [deleted] and the Services have programmed $5 billion to procure [deleted].

Other major self-protection jamming efforts underway to improve our tactical fighter survivability are the AN/ALQ-135 ECM system for the Air Force F-15E, a competition between the ASPJ and the AN/ALQ-189 for the F-111 airplane fleet, and the ALQ-126B for the Navy's limited service life aircraft, (A-4, A-7, F-4, etc.).

Concentrated efforts are underway to provide new and improved [deleted]. These efforts include the Air Force's AN/ALR-74 for the F-4E's and F-16's, the ALR-56 for the F-15E, and a product-improved ALR-62 for the F-111 fleet. [deleted].

For the Navy's surface ships, the primary thrust is to provide self-protection for combatant ships and aircraft carriers. There are currently more than [deleted]. Developments will continue to provide decoys and countermeasures against monopulse radar. The combined funding for development and procurement during FY 1986–FY 1990 is $923 million.

Both the Air Force and the Navy are building up the quality and quantity of our stand off jamming forces to counter early warning/GCI radar and communication links. The Navy has programmed [deleted] to procure [deleted]. [Deleted] aircraft each containing the ALQ-99 radar jammer and the ALQ-149 communication jammer. The Air Force has programmed [deleted] from FY 1986–FY 1990 to procure 42 EF-111 stand-off-jamming aircraft with the onboard ALQ-99 jamming system. In addition the Air Force is procuring [deleted] EC-130 tactical C^3 countermeasures aircraft (Compass Call) and has programmed [deleted] for the effort during FY 1986–FY 1990.

The Army's major EW and C^3 countermeasures system programs are the Tacjam, Quickfix, Adews, Exjam, and LWR systems. [Deleted] program being designed to [deleted]. The ADEWS is a joint Army/Air Force [deleted]. The ADEWS program will also include the EW and C^3 countermeasures capabilities previously in the Air Force's Comfy Challenge program.

[Deleted.]

The various procedures for maximizing the effectiveness of ECM operations are tested in joint service and allied exercises. For example, in the past, joint service exercizes such as Green Flag tested the combined effects of EA-6B's, E2C's Compass call, EF-111s, Wild Weasel, airborne command post and self-protection jammers to determine mutual interference effects. Also, a [deleted]. Another example is the Green Flag joint exercises which assess and provide training to the users on the effects of friendly military EW operations on military C^3 operations.

In addition to exercising operational integration, there are a number of organizations which develop procedural or material solutions to potential interference problems. For example, the Electromagnetic Compatibility Analysis Center (ECAC) analyzes the technical parameters of C^3 and Electronic Combat systems for use by material developers who build systems which must interoperate in joint and allied environments. Other agencies like the Military Communications—Electronics Board and the C^3 Systems Directorate of the Joint Chiefs of Staff also address policy and procedural solutions to operational integration issues. [Deleted.] To fully accomplish this with DOD's present military exercise or hardware simulation programs is not possible. These efforts need to be complimented with today's advanced digital computers to effectively evaluate the mutual interference between the many C^3I Systems. The results of these efforts will determine what military tactics and operational integration needs to be implemented. A DOD program which orchestrates the development and implementation of such a capability for obtaining these needs has been initiated.

New efforts of lesser magnitude are being vigorously pursued in R&D programs to counter the threat expansion into [deleted]. The Air Force has the lead in the INEWS joint program with the Navy to develop the next generation airborne electronic countermeasures capability for advanced technology aircraft, such as the Advanced Tactical Fighter (ATF) and the Navy's Advanced Tactical Aircraft (ATA). [Deleted.] During the FY 1986–1990 period, DOD plans to spend over [deleted] for the INEWS program.

The total request for Electronic Combat in [deleted].

VIII. CONCLUSION

The highlights I have presented illustrate the achievements, as well as the scope and depth of our planning efforts with the Services to achieve an affordable balance between force management and force capabilities. I believe that the programs I have outlined and the management initiatives I have discussed will result in continually improving C^3 interoperability to an affordable and sufficient level, a credible and integrated Electronic Combat capability and other equally vital characteristics for our C^3 systems. Your support of our C^3 request is urged so that the C^3 systems we obtain, along with their inherent capabilities, enhance deterrence and add to the combat potential of our forces. A C^3 resource overview chart is provided for your information.

Mr. Chairman, this concludes my remarks. I would be happy to answer any questions you or the Committee might have. Thank you.

C^3 RESOURCE OVERVIEW

[TOA—in billions]

	Fiscal year—		
	1984	1985	1986
By appropriation:			
RDT&E	$3.4	$4.1	$4.8
Procurement	6.4	6.1	8.3
Military construction	0.2	0.1	0.2
O&M	3.8	4.5	4.9
Military personnel	2.5	3.7	3.9
Total	16.3	18.5	22.1
By DOD component:			
Army	3.9	4.5	5.3
Navy/USMC	3.8	4.2	5.5
Air Force	7.5	8.8	10.1
Other	1.1	1.0	1.2
Total	16.3	18.5	22.1
By mission area:			
Strategic C^3	4.3	4.3	5.2
Theater and tactical C^3	2.4	2.9	3.9
Electronic combat	1.9	2.1	2.7
Defense-wide C^3	7.7	9.2	10.3
Total	16.3	18.5	22.1

Chairman **Goldwater**. Doctor, I want to thank you for that very well presented argument. I read someplace that you have a closet full of video charts or a couple trunks full.

Mr. **Latham**. Yes, sir. I brought a bunch with me.

Chairman **Goldwater**. They are very well done. Before we wind up, I would like to just talk briefly about a subject that we have just been discussing.

ELECTRONIC WARFARE

There are glaring deficiencies that remain in the electronic warfare area. The second reason I think this is so important to us and to our allies is that there is a strong tendency in NATO for the electronic warfare community for historical and security reasons to isolate themselves from the operational community. This situation, in my opinion, must change.

We have to change that argumentative sector in NATO just the same as we have to change it in that building across the way.

The members in the Army, Navy, and Air Force here, all of you are of star rank. ~~I would~~ like to implore you to make one of your goals for the coming year to get together. There is no reason why we can't communicate better.

If you want to go back into history, it is one of the reasons that 200 Indians kicked the daylights out of our Army because we couldn't communicate and they could. We never have seemed to learn the lesson of communication.

I go back to World War II and the experiences that I had to put up with flying around this world when you couldn't talk to Navy and you couldn't talk to Army and they couldn't talk to us.

There are times when I honestly think we are doing more fighting between the forces in the Pentagon than we are ever going to do between the forces of any enemy and ourselves.

I think the time has long passed when on such a simple subject as communications we give up this foolishness and start talking common sense.

I remember the days when the Navy didn't believe in high frequency, I remember the days when the Air force did not believe in ultrahigh frequency and now they do.

I am just imploring you as a member of this Senate who has 2 years to go, I hope you can get your heads together in this important field of communication. It is not the last you are going to hear from me on this subject.

It is not the fact that communications has been a life-long study and hobby of mine. It is just that I am getting sick and tired of seeing our services argue about what type of equipment to use to accomplish this same objective.

We have to continue our efforts with NATO, just as we have in the field of weaponry, we have to continue in the field of communications. I hope you fellows get the message. There is not much I can do.

We Senators can make a lot of noise, but when you get down to it, there is not much we can do, but we can give you trouble.

I thank you very much for coming over.

Senator Warner?

Senator **WARNER**. I wish to associate myself with the remarks of our distinguished chairman.

In a very modest way I was a radar man in World War II and a communications officer at one time with the First Air Wing in Korea. I have a modest background in this area. I join the chairman in the effort to see what we can do to make some progress in the area of interoperability.

It is a disgraceful situation to have this 1967 document still your principal directive on interoperability. I know that you are men and women of good will and you are struggling among yourselves to resolve these problems.

I would like to see us give you a helping hand.

Mr. Chairman, do you think we ought to put a line item in for carrier pigeons, or hold off?

Chairman **Goldwater**. How about smoke signals? They have some heliograph stations in Arizona that the Army put up in the 1870's and they work.

Senator **Denton**. I think that we are very fortunate having a senior member describe his experience in communications.

I want to say to you that we are lucky that we have a former Secretary of the Navy who knows about the incompatibility problem.

It is an institutional problem. As late as the time I retired in 1977, in amphibious warfare the Marines couldn't talk to the Air Force or to the Navy. There was a new tactical system that linked the ships but that still was having trouble.

It remains a problem, though apparently a diminishing one.

Mr. Chairman, I think it is worth noting that, in our tragic concentration with the defense budget freeze, we are wringing our hands and straining our minds. I don't envy you as chairman in trying to cope, as you have, with that problem.

RUDMAN PROPOSAL

I would mention that, in the Rudman plan, he recommends a sweeping reduction which is only 1.5 percent away from the President's. He recommends a relatively mild reduction in personnel, which he calls support personnel. I think the reduction totals 110,000.

You have a copy of the recommendation. He refers to the support personnel as folks we can get rid of. It so happens that the computer setup, which designates the kind of support personnel to whom he is referring, includes command and control people, logistical distribution people, and training people. Even through some anomaly, first sergeants of infantry companies in the Army are called support personnel.

I just want to alert the services to the need to express to us, in a way that we can express on the Senate floor, the effect of a freeze or the effect even of the Rudman plan.

If DOD has to reduce 110,000 support personnel, and a fraction of that is command and control, we have a problem because you are indicating that we need to catch up in this field or stay ahead because that is where the payoff is in quality over quantity.

I am so glad the chairman recognizes that. We are looking at potential disaster on the Senate floor, gentlemen.

Mr. **Latham**. A freeze will be an absolute disaster. I urge you to defeat that and we will do whatever we can to help you on that.

Chairman **Goldwater**. I might say that we have scheduled a hearing on the Rudman proposal. I offer only one word of caution.

In view of the beginning decline in reenlistments and new enlistments, that we talk about any reorganization as little as we can until we can find some reasonable answer.

We have been on a study in this committee for 3 years. We don't want to get it out. I don't want to see our forces go down.

It has been a real fine meeting. I want to thank you all for being here.

[Questions with answers supplied follow:]

Questions Submitted by Senator Barry Goldwater

STANDARDIZATION AGREEMENT

Chairman Goldwater. Dr. Latham, we have been hearing for more than 3 years now that the Standardization Agreement (Stanag) among the allies over the Mark XV NATO IFF is imminent. However, it is clear that there are still problems, particularly with the Germans. The Germans, however, are not entirely at fault, since the frequency band they favor (E/F) is the one originally agreed to by the Allies. What progress has been made toward reaching an agreement?

Mr. Latham. First, let me correct your impression that the E/F-band approach was "originally agreed to by the Allies." There has not been an Allied agreement on the E/F-band. Although the U.S. participated in the initial development definition of the E/F-band specification, we did so with written reservations regarding our concern for the potential cost of the E/F-band candidate, and our stated intention to investigate a D-band alternative in parallel. Additionally, France, consistently a D-band proponent, was a vocal opponent of E/F-band even before the U.S. voiced its concerns. Neither the U.S. nor any other nation has ratified a Stanag on an E/F-band system.

Progress toward an agreement on the U.S. D-band candidate has been slow, but substantial. The acceptability of a D-band alternative has been raised to the point that it is now included in the Draft Stanag on an equal status with the E/F-band alternative. The United Kingdom and France have indicated that they could accept the U.S. proffered compromise of adding a radar interrogation mode to the D-band system. Furthermore, we are in the process of negotiating a Memorandum of Understanding with Italy regarding cooperation on an IFF system. It is understood that this would be the U.S. Mark XV, D-band system. The German opposition to a D-band system has now abated and they have agreed to a compromise solution. Some details are yet to be agreed to but we believe that with continued U.S. resolve, commitments of other NATO nations and a maturing Mark XV development, we will now achieve agreement in NATO on a D-band system for the NIS.

MARK XV/NATO IDENTIFICATION SYSTEM

Chairman Goldwater. What were the results of the tests concluded in December in the Federal Republic of Germany to evaluate the acceptability of a D-band IFF?

Mr. Latham. Germany has not yet completed their report on the test program and has not formally released their results. However, members of my staff did receive a briefing by representatives of Siemens and ESG, two German companies involved in the testing. First, it is important to note that, in our judgment, the German test program was premised on the need to demonstrate the unacceptability of a D-band system in the German environment. Many of their conclusions seem to be focused—and I must emphasize that we have not been given their written report to analyze in detail their data and methodology—on demonstrating the superiority of E/F-band to a D-band system. Support for such a proposition is based in the results we have seen largely in the laws of physics. The technical superiority of an E/F-band Q&A system has never been challenged by the U.S. The issue for us was and remains the acceptability of a D-band system—not its superiority—when such factors as cost, performance, transition and the inescapable requirement to interoperate in D-band with the international civil air traffic control system are taken into account. The briefings provided no surprises. Based upon German assumptions, which in several cases differed widely from ours, the conclusions were: that the D-band system causes interference to civil air traffic control; and E/F-band is cheaper for Germany over a 20-year life cycle.

We disagree with much of the criteria and methodology used in the German evaluation. Our own results show that, while E/F-band has somewhat better performance, D-band meets the NATO operational requirement in that it matches the performance of the associated radar in the same jamming environment. Our frequency allocation analyses show that: (1) the Mark XV causes less interference than the current Mark X/XII system; (2) the major source of degradation to the civil system is self-interference; and (3) new signal processors at civil sites would provide much more improvement than moving to E/F-band. The United Kingdom and France have stated that, like the US, they are optimistic about the chances for a frequency allocation in D-band. Within the U.S. a Stage II frequency allocation has been granted for the Mark XV.

Regarding the relative cost of the candidates, the United Kingdom and France estimate that D-band would be 20% less expensive than E/F-band for their inventory, while our own analyses show that D-band is 50% cheaper. Germany indicates that E/F-band is 30% less expensive than D-band for its inventory but, unlike the other nations, Germany has not included in its E/F-band estimates the necessary costs of maintaining backward compatibility with the current D-band military and civil systems.

Chairman **Goldwater**. In the face of the current disagreement among the Allies on the selection of a frequency band, why should the United States proceed with the development of the Mark XV IFF?

Mr. **Latham**. The DOD has a strong requirement for an improvement in our capability to identify friendly aircraft. Since a change in frequency band is unaffordable to the US, delays in developing a D-band system will only bring further delays in satisfying this need. Furthermore, interruption of the US program would decrease the likelihood of reaching agreement with Germany, since they would interpret it as weakness in the US commitment to develop a D-band system.

A highly reliable, friend identification system is needed to reduce the risk of fratricide, particularly for beyond-visual-range and quick-reaction weapon systems. All DOD CINCs, Services and Agencies endorsed, in January of this year, the Multi-Command Required Operational Capability (MROC 20–83) for the Mark XV. The Joint Requirements Management Board, consisting of the Service Vice Chiefs and the Director, Joint Staff, subsequently reviewed the requirement. They concluded on 27 July 84 that "deficiencies of the current Mark XII system in jam resistance, exploitability, and lack of future FAA/ICAO compatibility . . . are indications of the urgency with which replacement of the Mark XII must be pursued."

NATO interoperability is a major consideration in developing the Mark XV, and we are making every effort to secure an agreement on the system. However, U.S. worldwide military and civil requirements dictate the need for the system, even in the absence of complete NATO agreement. It should be noted that the Mark XV equipment will incorporate the current Mark X and Mark XII capability, so that the U.S. will continue to interoperate in these modes with those NATO Allies who, for whatever reason, do not implement the Mark XV.

Chairman **Goldwater**. Would you explain (in layman terms) how the Navy and Air Force systems will be interoperable?

Mr. **Latham**. The Air Force JTIDS terminals employ what is called the Time Division Multiple Access (TDMA) architecture while the Navy terminals are designed primarily to employ a variation of that architecture called Distributed Time Division Multiple Access (DTDMA). The difference between the two architectures lies principally in the organization and timing of JTIDS pulses as they are transmitted and received by JTIDS terminals. The Navy terminals are being designed to also operate in the TDMA mode specifically to permit interoperability with Air Force terminals. Thus, in operational scenarios requiring intercommunications between Air Force and Navy JTIDS platforms, the Navy JTIDS terminals would employ the TDMA architecture on the joint interoperability nets while simultaneously employing the DTDMA architecture on intra-Navy nets.

Chairman **Goldwater**. Will these systems be interoperable in a sophisticated jamming environment.

Mr. **Latham**. Yes. Given the expected levels of JTIDS usage, both the Air Force and Navy JTIDS terminals will have identical degrees of jam-resistance. Furthermore, the jam-resistance of the Navy terminals will not be degraded while simultaneously operating on TDMA and DTDMA nets.

DTDMA SYSTEM

Chairman **Goldwater**. If the Navy proceeds with the DTDMA system, will they be interoperable with NATO allies.

Mr. **Latham**. Yes. The Navy DTDMA terminals, which can operate in a TDMA mode or DTDMA mode or both simultaneously, will be interoperable with currently planned allied JTIDS systems. There currently exists an agreement within NATO that the TDMA mode will be used for interoperability between TDMA and DTDMA JTIDS terminals.

Chairman GOLDWATER. Will the Navy be able to interoperate with these allied systems in a jamming environment?

Mr. LATHAM. European JTIDS systems are being built to the same jam-resistant specifications as U.S. systems. Interoperability between European and U.S. systems (including both Navy and Air Force Systems) will be possible under full JTIDS jamming protection.

QUESTIONS SUBMITTED BY SENATOR STROM THURMOND

Senator THURMOND. General Rogers has stated that one of his highest priorities is modern communications [deleted].

What improvements in communications are underway for these forces in [deleted] communications?

Mr. LATHAM. [Deleted.]

Senator THURMOND. Are there any development programs to improve [deleted] communications equipment?

Mr. LATHAM. [Deleted.]

QUESTION SUBMITTED BY SENATOR JOHN WARNER

AIRBORNE ELECTRONIC JAMMER

Senator WARNER. I understand that we are continuing to incure delays in the joint program to develop an airborne electronic jammer, the ASPJ.

Would you please comment on the wisdom of waiting for the ASPJ as opposed to installing the ALQ-189, which will be ready on the FB/EF-111?

Mr. LATHAM. During the past year, the Air Force and Office of the Secretary of Defense (OSD) staffs performed intensive reviews of the Airborne Self-Protection Program (ASPJ) and ALQ-189 program to determine the most suitable electronic countermeasures system for the F-111 fleet. Additionally, two independent consultants reviewed the programs and provided their assessment. However, these assessments did not produce a consistent set of findings in the areas of performance, cost, schedule, and logistical supportability. As a program update, the Department of Defense has accepted delivery of seven ASPJ production prototypes while delivery of the first ALQ-189 production prototype is not expected until September 1985. Although the ASPJ program has experienced delays because of technical complexity, ASPJ systems currently are undergoing integration and testing while the ALQ-189 doesn't start integration and testing until FY 1986. Based on the current schedules, neither the ASPJ nor the ALQ-189 can be ready for concurrent installation with the F-111 Avionics Modernization Program. Since neither system is ready for F-111 installation, the Department of Defense objective is to determine which system, ASPJ or ALQ-189, provides the best performance, cost, schedule, and logistical supportability benefits. To satisfy the objective as soon as possible, OSD directed the Air Force to initiate a head-to-head competitive selection process between the ASPJ and ALQ-189 contractors to obtain credible cost, schedule, and supportability data and commitments. This competitive acquisition strategy between the ASPJ and ALQ-189 contractors will enable the Department of Defense to select the most capable electronic countermeasures system for the F-111 fleet.

QUESTIONS SUBMITTED BY SENATOR JOHN GLENN

INTEROPERABILITY

Senator GLENN. Secretary Latham, you note in your statement that interoperability depends not just on hardware, but depends just as critically on interoperable procedures, doctrine, planning, etc.

In your judgment, do the services have interoperable protocols in the area of communications? What mechanism exists for developing interoperability at the procedural level among the services?

Mr. LATHAM. Interoperable protocols do exist in the Services but the need for improvement has been recognized. Existing, fielded systems have well established protocols peculiar to their application and portion of the electromagnetic spectrum. For example, the interface protocols for unsecure, non-antijam FM voice combat radio are widely accepted. Such is the case with other systems such as radio teletype, multichannel systems, UHF voice, HF voice, etc., Interoperability problems are becoming significant because the threat, growing technological sophistication and expanding user requirements have created new challenges and roadblocks to be overcome. We are facing up to and solving these new challenges as well. Programs such as SINCGARS, JTIDS and Milstar will provide high levels of the interoperability in the significant areas of combat radios, data information and satellite communications.

One major mechanism in existence to develop interoperability at the procedural level is incorporated in the Joint Interoperability for Tactical Command and Control Systems (JINTACCS) program. The program's main thrusts are to help solve command and control interoperability problems, enhance information transfer and to develop interface procedures. JINTACCS has made significant progress in developing message text formats (MTFs) (human and machine readable) and bit-oriented formats (machine readable for computer-to-computer use). The MTFs will undergo operational effectiveness demonstration (OED) this year. In preparation for that, a considerable training effort has been initiated which will ensure procedural interoperability at the operator level. Providing standard, machine readable formats contributes to interoperability by allowing automated processing of real-time critical data elements that have joint standard definitions. A strong testing and configuration management program is taking shape to ensure adherence to the approved standards.

Oversight of interoperability in tactical communications and management of JINTACCS is being provided by the recently formed Joint Tactical Command, Control and Communications Agency (JTC^{3}A). My testimony covers the Agency's responsibilities in greater detail. The Defense Communications Agency performs similar functions in the strategic and theater areas.

Finally, the United States Readiness Command (USREDCOM) is tasked to develop joint tactics, techniques and training under the guidance of the JCS, which also contribute to interoperable procedures and doctrine.

Senator GLENN. There has been a good deal reported about the lack of interoperability and communications problems in Grenada. To what extent were those problems caused by hardware limitations, and to what extent were they produced by lack of common procedures, protocols, etc. in the area of communications?

Mr. LATHAM. The root of those reported problems can be traced back in most cases to not having sufficient time and attention paid to a communications plan before the operation began. The extremely compressed time-frame for planning and "close-hold, limited need to know" security procedures kept knowledgeable C^3 personnel out of the planning phase.

[Deleted.] These problems have been addressed and corrective actions are underway. The JCS and the CINCs are now acutely aware of the need to pay adequate attention to the communications plan and procedures before launching such an effort.

Senator GLENN✓ What organization within DOD has responsibility for insuring interoperability of procedures and doctrine?

Mr. LATHAM. The JCS is responsible for insuring interoperability of joint and combined, procedures and doctrine. The ASD(C^{3}I) is responsible for PPBS, Congressional, financial and programmatic actions involving C^{3}I development and acquisition programs. As such, he has significant authority to enforce interoperability requirements identified by the JCS. The Joint Tactical Command, Control and Communications Agency (JTC^{3}A) was recently formed as an operating agency tasked to:

Develop and maintain a joint tactical C^3 architecture by defining the architecture for joint tactical communications systems (including non-strategic nuclear forces C^3) and by defining interface specifications required to ensure interoperability and information flow among command and control systems in accordance with the guidance and direction provided by the JCS and the ASD(C^{3}I).

Develop, test and maintain technical and procedural interface standards to be used by tactical C^3 systems in joint or combined operations, and verify that such systems have implemented properly the approved interface standards.

Monitor and coordinate programs for which the JTC^{3}A has responsibility but which are included in the programs of other DoD Components and agencies, and monitor other programs that may affect tactical C^3 interoperability.

With its activation, the JTC^{3}A has taken over program management responsibility for the Joint Interoperability of Tactical Command and Control Systems (JINTACCS) program. The JINTACCS program was established by the JCS specifically to help achieve and maintain joint and combined interoperability by developing common message standards and procedures for critical command and control functional areas.

As mentioned, in answer to an earlier question, two other organizations play a significant role. The Defense Communications Agency performs similar functions to the JTC^{3}A in the strategic and theater areas. The United States Readiness Command (USREDCOM) is tasked to develop joint tactics, techniques and training under the guidance of the JCS, which also contribute to interoperable procedures and doctrine.

INTEROPERABILITY WITH NATO ALLIES

Senator GLENN. The Army and Air Force are starting to field a new radio system known as SINCGARS which provides combat net radios at company level and above, as well as in aircraft. The Federal Republic of Germany is also buying a radio known as SINCGARS. Both the U.S. version and the German version of SINCGARS are built by ITT. It was confirmed in earlier hearings before this committee that the U.S. SINCGARS will not be fully interoperable with the German SINCGARS.

A. Who is responsible for this problem?

B. Why did not the NATO planning commission specifically charged for communications interoperability deal with it? Did the United States ever formally raise this issue in NATO? Are you the representative to the NATO commission on communications interoperability?

C. What can be done now to make the systems interoperable?

D. One of the key selling points about Mobile Subscriber Equipment for the Army is that it will be interoperable with the radio-telephone systems of other countries. How do we know we are not creating another problem like the SINCGARS problem?

Mr. LATHAM. First, let me clarify for you that the German VHF combat net radio is called the Fuger-A and not SINCGARS. The U.S. SINCGARS radio and the German Fuger-A are presently not interoperable in the Electronic Counter-Counter Measures (ECCM) or data modes. However, these radios are interoperable in the "clear" mode of operation.

A. The lack of ECCM interoperability between these two radio programs has occurred because of programmatic, technical and operational differences. When the U.S. Army made the decision in 1981 to accelerate the SINCGARS program, it became clear that the ECCM development schedules of both countries were no longer in synchronization. The U.S. decision to accelerate made ECCM mode comparison testing with the German radio difficult since the German development effort was considerably behind the U.S. schedule. When the German ECCM mode was finally ready for testing the U.S. was already in production for its SINCGARS radio. In my view the mistakė was made by both countries in the late 1970's. Rather than developing two separate ECCM technical approaches and attempting to compare them, an agreement on a single technical approach assuring interoperability should have been made prior to the start of development. However, the U.S. Army Acquisition Strategy which included competitive advanced development (3 companies in competition) and the developer (Standard Electrick Lorenz) (SEL) produced differing technical approaches and generally prevented this from happening. It also turns out that there are significant differences in the operational concepts of the two Armies which make ECCM interoperability even more difficult. The U.S. intends to have an ECCM capability on all SINCGARS radios whereas the German's only intend to equip approximately 20% of their radios with an ECCM capability. Further, the German's will only have an ECCM capability on their Vehicular Radios and not on their manpack versions.

B. The Tri-Service Group for Communications-Electronic Equipment is the NATO organization which deals with communications interoperability for National Forces, more specifically, Subgroup (SG) 2 on Tactical Communications of this organization addresses single channel combat net radio interoperability. This SG has resolved the issue of VHF-FM combat net radio interoperability in the secure but non-AJ Mode with the ratification of a standardization agreement (Stanag) 4204. However, no agreement on an ECCM standard has been reached. It was hoped that an agreement between the U.S. and Germany would produce a draft Stanag which would be the basis which the other nations would follow. Since the U.S. and Germany have failed to reach an agreement on a standard VHF ECCM Waveform to date, no standard exists. It is expected now that both the U.S. and Germany will submit their respective ECCM approaches to the Subgroup as potential candidates.

I am not the representative. My Director for Theater and Tactical C^3 is the U.S. representative to the Tri-Service Group for Communications-Electronic Equipment.

C. U.S. and German representatives have continued to look for ways to achieve VHF ECCM interoperability. We have identified at least six potential options to "Fix" the interoperability problem. These are summarized as follows:

1. Redesign SINCGARS to enable direct interoperability with Fuger-A in the ECCM mode.
2. Request that the FRG redesign the Fuger-A to enable direct interoperability with SINCGARS.
3. Have the US and FRG program managers determine minimum mutual system redesign requirements that would provide ECCM interoperability.
4. Develop an interoperable mode that would allow either radio to hail the other while in the ECCM mode.
5. Exchange liaision teams at all echelons where interoperability is required.
6. Provide the FRG SINCGARS radio where interoperability is required.

All of the above options have programmatic and operational impact. Options to change either system would increase cost as well as delay production programs. Further, planned FRG operational deployment of only vehicular mounted ECCM equipment would severely limit interoperability in a severe jamming environment even if their standard was adopted by the U.S. since German manpacks would not be able to communicate with U.S. equipment. "Hailing mode" options don't provide the needed antijam capabilities and should be ruled out as a solution. Liaison team or radio exchange options have the least near-term impact on either program. However, CINCEUCOM has stated that manpower allocations would have to increase to carry out this liaison function. Further, we are concerned that liaison and equipment changes for interoperability may encourage other NATO nations to adopt nonstandard ECCM equipment. The U.S. Army and the JCS have been directed to reexamine the extent of the requirement for U.S./German interoperability and recommend both a near-term and long-term solution for achieving it. These recommendations should be forth coming in the next six months.

D. The issue of radio-telephone interoperability amongst NATO countries has been thoroughly discussed by the Tri-Service Group for communications-electronics equipment and an agreement exists for achieving this interoperability. The so-called Stanag 5040 Box is an interface device which will assure interoperability among the various tactical telephone systems of the NATO nations. For this reason we are confident that the MSE System will be able to interoperate with other tactical telephone systems.

JTC^{3}A

Senator **Glenn**. Mr. Latham, you note in your statement that a new organization, the Joint Tactical Command, Control and Communications Agency, was established last year to resolve interoperability issues. You describe their task as one of building "roadmaps" to insure interoperability.

Has the Joint Tactical Command, Control and Communications Agency officially commented on the Army's Mobile Subscriber Equipment program?

Mr. **Latham**. The Joint Tactical Command, Control and Communications Agency (JTC^{3}A) was not established at the time the Mobile Subscriber Equipment (MSE) Request for Proposal (RFP) was developed and released. However, the Joint Tactical Communications Office (JTCO) as the TRI-TAC Executive Agent, provided comments to the Army on the MSE RFP. On July 5, 1984, with the approval of the JTC^{3}A charter, the JTCO became the nucleus of the new organization. Since its formation, the new Agency has not "officially" commented on the MSE program but they do recognize it as a viable tactical C^3 architectural concept and are following its evolution, especially as regards the interoperability aspects. In fact, the JTC^{3}A is currently providing representation on an "as required" basis to the MSE source selection board.

REQUEST FOR PROPOSAL

Senator **Glenn**. The staff informs me that the Request for Proposal (RFP) for Mobile Subscriber Equipment did not place interoperability in the baseline program, but made interoperability an "option" that had to be supplied with the proposal, but not one that the contractor was obligated to build in. Did or has the Joint Tactical Command, Control and Communications Agency comment or protest this procedure? Who would they protest to?

Mr. **Latham**. Mobile Subscriber Equipment (MSE) offerors were required to propose interoperability with specified existing systems, and not already included in their existing system, as priced options. This was done to insure that no potential bidders would be eliminated by arbitrarily requiring that an offeror's existing system interoperate with all specified existing Army systems. This in turn allows the government to selectively incorporate interoperability with the specified existing systems based on economic and technical feasibility. It should be noted that the offered systems have a level of inherent, though not identical, interoperability built in.

The Joint Tactical Communications Office (JTCO) was one of the predecessor organizations of the Joint Tactical Command, Control, and Communications Agency (JTC^{3}A) and most of the JTCO personnel remained with the new Agency. The JTCO was responsible for the Tri-Tac program. In that role, the JTCO reviewed the Army proposal and provided comments to the Army.

In the future, if the JTC^{3}A protested a particular acquisition strategy, the Director would most likely respond in the manner described in the answer to the following question.

Senator **Glenn**. To whom does the Joint Tactical Command, Control, and Communications Agency report? What powers do they have to suspend action on a program until questions of interoperability are resolved? What powers do you have to suspend action on a program if you feel there are unresolved questions of interoperability?

Mr. **Latham**. In accordance with his charter, the Assistant Secretary of Defense for Command, Control, Communications and Intelligence (ASD(C^{3}I)) exercises direction, authority and control over the Joint Tactical Command, Control, and Communcations Agency (JTC^{3}A). In accordance with the JTC^{3}A charter, the Director for Command, Control and Communications Systems (C^{3}S) in the Organization of the Joint Chiefs of Staff (OJCS) also provides direction and guidance. This follows from their respective statutory and organizational responsibilities. In order to provide coherent guidance and direction to the Agency, the ASD(C^{3}I) and the Director, C^{3}S, OJCS, have adopted and co-signed a memorandum of understanding to jointly coordinate all taskings to the Agency.

The JTC^{3}A does not have power to suspend action on a program. We have given the Agency the technical job of developing the interface standards for C^3 systems used in Joint tactical operations and to represent us in developing such standards for Combined operations. In support of periodic program and budget reviews for the Organization of the Joint Chiefs of Staff (OJCS) and the Office of the Secretary of Defense (OSD), the Agency will also verify whether the military Services implement those standards as they develop and program new C^3 systems. If in the course of carrying out its assigned tasks the Agency uncovers an interoperability problem in a particular program the Agency Director would first consult with the particular Service's or CINC's program manager (or other appropriate authority) and attempt to resolve the problem. If the problem could not be resolved at that level (e.g., a design constrained by requirements set at Service level), the Director may then take it to the senior C^3 officer in the responsible Service. If that fails also, the Director would then be obliged to report the problem to the Director, C^{3}S, and/or ASD(C^{3}I) along with a recommendation for action that should be taken.

The JCS are charged to ensure compliance of DOD components with the approved tactical C^3 standards and the architecture that will form the basis for them. The final mechanism to enforce the standards is based on the authority to approve or disapprove the Service programs. We retain that authority within OSD. The ASD(C^{3}I) has the power to suspend action on a program or take other appropriate action if there are unresolved questions warranting such action.

COMBAT IDENTIFICATION SYSTEM

Senator **Glenn**. DOD has decided that the best combat identification system (IFF) for U.S. forces is the Mark XV system. For some time there have been problems reaching agreement within NATO over a common IFF system.

When will we decide, come hell or high water, that we will go forward with the Mark XV IFF system? When we make that decision, what do you think the Germans will do?

Mr. **Latham**. The DOD has decided to go forward with the Mark XV. Secretary Weinberger informed the German Minister of Defense, Manfred Woerner, in a letter dated 30 December 1983, that "the E/F-band is not really acceptable due to its cost. . . . we must proceed with a D-band system to satisfy our own civil and military requirements." Following a 24 July 1984 DSARC I on the Mark XV, the Secretary directed that the Mark XV program be accelerated. We understand that Germany has reconsidered their position. Germany now agrees to a D band solution, but, we do have some details yet to be worked out.

Senator **Glenn**. During testimony earlier this week, the Air Force reported that an IFF unit will cost an average of $65,000 based on a projected purchase of 17,000 units. That presumes that the Army will buy the Mark XV for all its air defense units, including the two-man Stinger teams. The Stinger teams would constitute 14,000 of the 17,000. The Air Force indicated that the Army is reviewing whether or not it will go ahead with the Mark XV. If the Army decides not to put the Mark XV on all Stinger units, how much higher will be the average price of the Mark XV, if we produce only 3,000 or 4,000 units compared to 17,000?

Mr. **Latham**. If the Mark XV replaces the Mark XII on a one-for-one basis, an estimated 41,000 equipments will be required (24,000 transponders and 17,000 interrogators). Of the 17,000 interrogators, about 9,300 would be for Stinger. These interrogators are distinctly different from those used with other systems (Patriot, fighter aircraft, ships, etc.) due to the reduced range of operation and the restrictive size and weight limitations. Thus, if Mark XV is not applied to Stinger, there will be little effect on the cost of the other 8,000 interrogators and, of course, no impact on the cost of the 24,000 transponders.

Senator **Glenn**. If the Army stays with the Mark XII IFF system for Stinger units, would the Air Force insist on continuing the same relatively restrictive control over weapons release authority for Army air defense units?

Mr. **Latham**. Yes. However, confidence in the IFF system (Mark XII or Mark XV) is only one factor affecting the control of Army air defense units. Others include the relative number of friendly and enemy aircraft in the area, the value of the asset being protected, the trend of the conflict, and the availability of other sources of identification information (e.g., noncooperative sensors and command and control inputs). Therefore, weapons release authority will also depend on the combat situation. If Mark XV is implemented, and as operators gain confidence in this superior system, it is possible to foresee situations in which there will be a significant relaxation of release authority.

Senator **Goldwater**. The meeting is adjourned.

[Whereupon, at 11:23 a.m., the subcommittee adjourned, subject to the call of the Chair.]

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